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and
AIRCRAFT ENGINEER

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The Outlook

To Start You Thinking

DELIBERATELY provocative is the article which we publish this week on new layouts for what Sir Roy Fedden calls an executive aircraft. Sir Roy, as is but natural in the circumstances, approaches the problems from the engine designer's rather than from the aircraft designer's point of view, and we have no doubt that some of the latter will disagree with him. Nevertheless, the article gives much food for thought, and even if the schemes outlined may appear somewhat ambitious, especially in the matter of elapsed time before they could be brought to fruition, there is no denying the fact that there would be many advantages in the tail-propeller layout, not least among which the clean aerodynamic form and the excellent view from the cabin.

The schemes recommended are not, of course, new, nor does Sir Roy claim them to be. The very first aircraft incorporating this feature was the Paulhan-Tatin "Torpille" of about 1911, exhibited at the Paris Aero Show. That was quite a small single-seater machine with a wing span of 30ft and an empty weight of 770 lb. The engine was a 50 h.p. Gnome rotary, housed inside the fuselage on the centre of gravity and cooled by a somewhat primitive arrangement of louvres. The pilot sat in front of the wing. The "Torpedo" was not a success, but that may well have been due to causes other than the tail propeller. That it was "clean" aerodynamically was obvious to the eye; it was also confirmed by M. Eiffel's wind-tunnel model tests.

In more recent times we have had the Douglas Mixmaster and its smaller version, the Cloudster, incorporating more modern ideas, but otherwise basically similar to the 1911 design, which, as a matter of fact, would not look particularly "dated" at the present time except for its curved wire-braced wing and its two-wheeled undercarriage.

Quite recently we have in this country the little Planet Satellite, to which a reference is made in this issue. That machine incorporates other unusual features, notably magnesium construction.

That the aerodynamic gain to be expected from fuselage-housed twin engines would have to be paid for in other ways is to be assumed. For instance, the fact that all the weight is concentrated in the fuselage would presumably increase the specific weight of the wings. With wing-mounted engines, the weight of the power plants is a relieving load. The transmission shafts and gears would add a certain amount of weight. The passengers might find the close proximity to the engines rather noisy, and there might be a good deal of vibration. A certain amount of lift would be lost by the absence of slipstreams over the wings.

There are many interesting aspects deserving of study, and we hope Sir Roy's article will start our readers thinking—and writing.

Home Orders

WHILE work proceeds on certain modifications of the first prototype Ambassador, and on the building of the second, there is naturally a good deal of speculation concerning the fate of this very interesting and promising type. Being a private venture, the design and construction of the Ambassador have not shared the benefits which accrue from Government-sponsored orders, and in these difficult times no firm can be expected indefinitely to finance a long-term policy entirely out of its own resources.

In an Airspeed progress report, a summary of which we publish this week, the position is made quite clear. Although potential foreign and overseas purchasers have shown much interest in this machine, its production in quantities may be doubtful unless home orders are forthcoming. Should that happen, a very valuable export market would be lost, and that at a time when, we are told, either we export or we go under.

A perusal of the data for subsequent machines shows

that the Ambassador is capable of a great deal of development, the production version being stressed for an increase in all-up weight from the 45,000 lb of the prototype to 52,500 lb. This increase will become usable with the improved types of Centaurus piston engines; a great increase in performance will result from the fitting of airscrew-turbines when these become available.

It is very much to be hoped that the three corporations and R.A.F. Transport Command will show a practical interest in a type of aircraft with such great possibilities and thereby make possible its full development.

The Speed Record

CONGRATULATIONS to our American friends on their magnificent achievement in raising the world's speed record to the truly remarkable figure of 650.6 m.p.h. (1,047 km/h.). In last week's issue we pointed out that the U.S. Navy Bureau of Aeronautics, in a revival of the old rivalry between Army and Navy, was likely to try to wrest the record from the U.S. Army Air Forces, but frankly we hardly expected the attempt to be made quite so soon.

Pending fuller information than is available at the moment of going to press, it is impossible to give a detailed appraisal of what the new record figure means in terms of jet thrust, Mach number and other related factors, but whatever were the conditions at Muroc Lake, the new record is a credit to all concerned. One fact which is remarkable is that the record was established by an aircraft having "normal" (not swept-back) wings. As the Mach number must have been somewhere in the region of .87 this is not the least surprising aspect of a very surprising performance.

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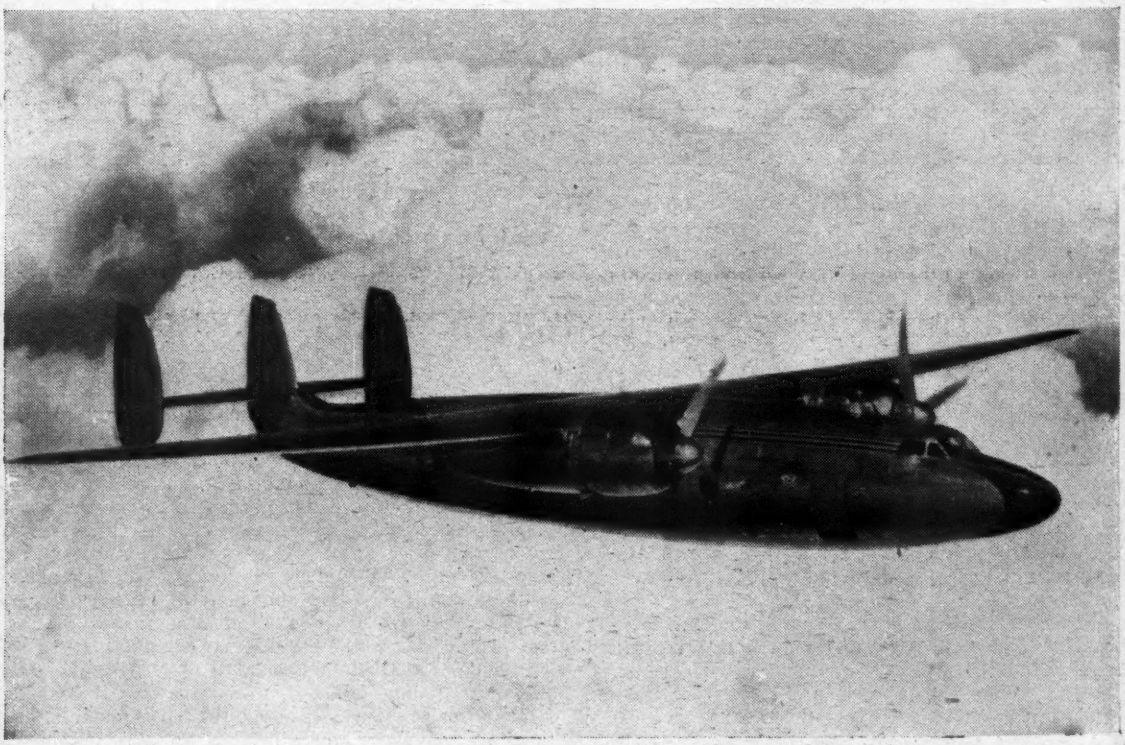
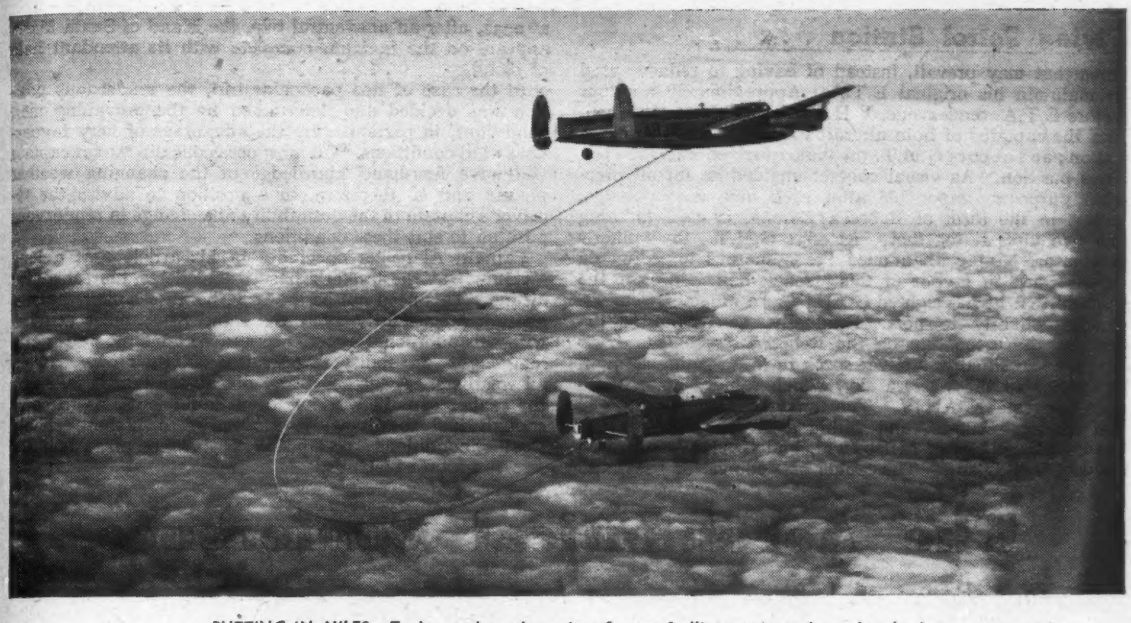
The Tudor Tragedy

REGRETTABLE as is the mishap to the B.O.A.C. flying-boat off Bahrein Island, in which several people lost their lives, it is not so disturbing as is the accident to the Tudor II. The one is the sort of operational mischance (in the course of a night landing) against which the best-laid plans cannot guard entirely. The other was to have been a very ordinary and, it would have been assumed, riskless test flight.

That something went wrong during or just after the take-off is obvious. What it was we do not yet know, but the one consolation is that Mr. S. D. Davies, who became chief designer a few months ago, is not badly hurt; he may be able to throw some light on the cause of the tragedy. In the meantime we can but grieve over the loss of these valuable men, and regret that the accident should have happened.



OVERWEATHER ELEGANCE: Taken during a two-hour test flight last Saturday, this photograph of the Airspeed Ambassador prototype shows its fine lines against a cumulo-nimbus background at 12,000ft. The prototype had, at the time, made only two previous flights and was being flown by Mr. G. B. S. Errington.



PUTTING IN MILES: Tanker and receiver aircraft at refuelling stations above the clouds.

Flying Petrol Station

The Flight Refuelling Operation from the Tanker Pilot's Point of View

By CAPT. S. R. JEFFREY

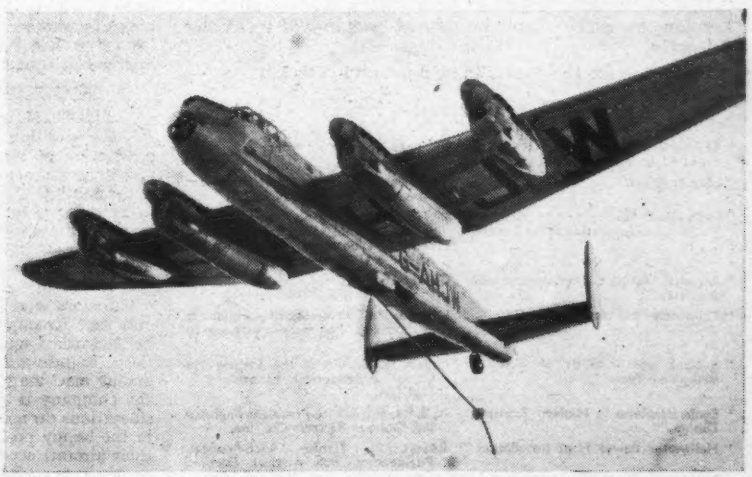
FOR a group of men stationed on the small mid-Atlantic island of Santa Maria in the Azores, the operation of flying petrol tankers has become an unexciting everyday occurrence. In fact, to-day a trans-Atlantic aircraft is refuelled in flight with almost as little fuss as refuelling by a motor bowser at the airport.

The following description of one such operation is the other side of the picture of Captain Alabaster's record flight from Bermuda to England in 13 hr 34 min (Capt. Alabaster, of B.S.A.A., described this trip in *Flight* of July 17th). It starts at midnight on June 8, 1947, when the first indication of Capt. Alabaster's intentions are received in the form of a signal in Santa Maria Control by a representative of Flight Refuelling, Ltd., from Bermuda. This signal is terse and to the point. "FE 2 2220 4330N 3000W 0645Z 11000 700." Translated, this means that Capt. Alabaster will leave Bermuda at 22.20 G.M.T. and would like to be met at a point 400 miles north of Santa Maria at 0645 G.M.T. at an altitude of 11,000ft and to be supplied with 700 gallons of fuel. It was apparent after consulting Santa Maria Met. that Capt. Alabaster was taking advantage of favourable westerlies and intended following a direct Rhumb Line track to England.

After this original message, Lancaster G-AHJV's track is carefully followed by reference to his hourly P.I.C.A.O. position reports; any variation of E.T.A. is noted, and the tanker's take-off time adjusted accordingly. Finally, 0330Z is decided upon, and from this time onward it is the responsibility of the wireless operators to establish and maintain communication between the two aircraft.

Until dawn, the tanker's navigation was determined by a series of astro fixes, after which the radio range on the island of Terceira was used to obtain position lines. It is obvious that the geographical position of this area does not allow for accurate radio fixing, and navigation must to a large extent be determined by D.R.

The tanker's crew have taken the precaution of allowing an extra half-hour in their flight plan to allow the receiver's captain to take advantage of any favourable flight condi-



THE HOSE GOES OUT: A small parachute, carried near the nozzle, aids the smooth unwinding of the pipe-line.

Flying Petrol Station . . . . .

tions that may prevail, instead of having to reduce speed to maintain his original E.T.A. Approximately an hour before E.T.A. rendezvous, V.H.F. contact was established, and the captains of both aircraft were in verbal communication; and at 0615 G.M.T. the tanker arrived at his rendezvous position. As visual contact unaided is, for all practical purposes, impossible after such long sea crossings, radar, in the form of Rebecca/Eureka, is used to bring the two aircraft together. At 0631 G.M.T., the tanker's navigator, having abandoned the numerous impedimenta of his trade in favour of this "magic-box," informs the captain that he has sighted G-AHJV at a range of 40 miles, bearing slightly to port. Gradually, as the range decreases, the green blip on the Rebecca screen gets lower and lower. Finally, a silver speck in the morning sunlight is spotted in the western sky, which rapidly materializes into Lancaster G-AHJV. The tanker captain turns on to the receiver's course, and within a short time contact is made, 760 gallons of fuel passed, and G-AHJV speeds on its way to England. The tanker sets course for base, and at 0932, after an uneventful trip, the island of Santa Maria appears on the horizon, complete with its attendant halo of cloud.

In the case of this particular trip, the rendezvous position was decided and determined by the prevailing met. conditions, in particular by the advantage of very favourable wind conditions. On most occasions the tanker captain will have first-hand knowledge of the changing weather picture and is, therefore, in a position to advise the receiver's captain of the desirability of a change in rendezvous position to suit these conditions.

Captain Alabaster concludes in his article that a long "clamp" at the tanker's base would delay the scheduled airline. This need not be the case, because tanker captains operating constantly from the same base, must acquire, with this additional experience and without the strain of a long flight, an ability to operate from their own base in all weathers. A further safety precaution that is taken by the tanker captain working from Santa Maria is to carry enough fuel to divert, if necessary, to Lisbon, should weather conditions "clamp" at all diversion airfields in the Azores group of islands.

The Aeronautical Conference

Wide Range of Subjects Covered in Joint Meetings of R.Ae.S. and I.Ae.Sc.

DELEGATES to the Anglo-American Aeronautical Conference arranged by the Royal Aeronautical Society and the American Institute of the Aeronautical Sciences will debate no fewer than 19 papers, to be read on September 3rd, 4th and 5th. Ten of the papers will be read by American lecturers, nine by British. The lectures will be given at the Victoria Halls, Bloomsbury Square, London, and in view of the large number, two lectures will be given simultaneously throughout the three days.

On Tuesday, September 2nd, all delegates will be invited to a reception from 6 to 8 at the R.Ae.S. building, 4, Hamilton Place, to meet the president and council of the society, and the other delegates.

The Reading and District branch of the R.Ae.S. is holding its garden party at Woodley on September 6th, and delegates are invited to attend.

On Sunday, September 7th, the delegates and their ladies are invited by the president of the R.Ae.S., Sir Frederick Handley Page, to a garden party at Limes House, Stanmore, from 3.30 to 6.

And finally, on September 9th, the opening day of the S.B.A.C. Display, there will be a dinner at the Guildhall, London, at which many prominent people will meet the delegates.

Following are the papers to be read, and their authors:—

AMERICAN

Subject	Author
"Theoretical Consideration on High-speed Flight Stability and Control."	Dr. Theodore von Karman.
"Icing Problems"	Abe Silverstein, of the Flight Propulsion Research Laboratory, N.A.C.A.
"High-speed Testing in the Southern California Co-operative Wind Tunnel."	Dr. Clark B. Millikan, Acting Director of the Daniel Guggenheim Aeronautical Laboratory, Californian Institute of Technology.
"Personal Aircraft Performance and Economy."	Grover Loening, N.A.C.A.
"Thin-walled Monocoques"	Nicholas Hoff, Professor of Aeronautical Engineering, Polytechnic Institute of Brooklyn.
"Resumé and Analysis of N.A.C.A. Wing-flow Tests"	Robert R. Gilruth of the Langley Memorial Aeronautical Laboratory N.A.C.A.
"Some Problems in Modern Transport Design."	A. E. Raymond, Vice-President Engineering, Douglas Aircraft Co., Inc.
"Helicopter Power Plant Installation"	Robert M. Stanley, Vice-President Engineering, Bell Aircraft Corporation.
"The Future of the Reciprocating Engine."	Ronald M. Hazen, Director-Engineering, Allison Division, General Motors.
"Light Aircraft"...	T. P. Wright, Administrator, C.A.A.

BRITISH

Subject	Author
"Control in Low-speed Flight" ...	M. B. Morgan, Royal Aircraft Establishment.
"Modern Operational Factors Affecting Airworthiness."	K. T. Spencer, Ministry of Supply, and P. A. Hufton, A. and A.E.E., Boscombe Down.
"Performance in High-speed Flight" ...	W. G. A. Perring, Director of the Royal Aircraft Establishment.
"Structural Problems of Large Aircraft."	Henry Knowler, Director and Chief Designer, Saunders-Roe.
"Design Problems Arising from Sweepback."	E. J. Richards, Chief Aerodynamicist, Vickers-Armstrongs, Weybridge.
"The Development of Thick Skin Construction."	Dr. D. Williams, R.A.E.
"Turbine Engine Icing Problems" ...	A. G. Elliott, Chief Engineer and Director Rolls-Royce.
"Helicopter Rotor Systems and Control Problems."	R. Hafner, Chief Designer, Helicopter Dept., Bristol Aeroplane Co.
"Turbine Propeller Engines"	F. M. Owner, Chief Engineer, Bristol Aeroplane Co.

TEST PILOT APPOINTMENT

ARMSTRONG SIDDELEY MOTORS, LTD., have recently formed an engine flight development section with S/L. W. B. Price Owen as chief test pilot. Preliminary work on installations and pre-flight testing of Pythons and Mambas has been going on for some months, and it will not now be long before these units fly; two Pythons in the outboard positions of a four-engined bomber and a Mamba probably in the nose of a similar machine. S/L. Price Owen recently resigned from the R.A.F., in which he was last employed as O.C. fighter-test squadron at Boscombe Down.

ERCOUPES STILL IN PRODUCTION

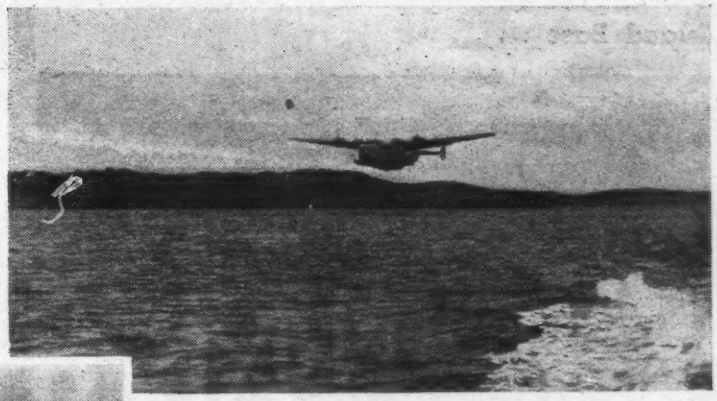
ALTHOUGH, as notified in our issue of June 19th reviewing the position of Roy Fedden, Ltd., it was stated that production of aircraft by the Engineering and Research Corporation, makers of the Ercoupe, had been suspended, we now understand that this is not wholly accurate. Over-optimism in assessing potential sales resulted in many American aircraft manufacturers over-producing, and when it was seen that the market was not in fact so wide nor so eager as had been thought, particularly in the light plane field, nearly all concerns went in for retrenchment in a big way.

Rumours were circulating here that Ercos had closed down and that Ercoupes and the proposed Airsedan were no longer being worked upon. The truth of the matter is that the E.R. Corp. is primarily a manufacturing concern devoted to producing machine tools—aircraft are virtually a sideline. Further, the company is a private one and, therefore, shareholder considerations do not interfere with policy. The company are thus in the happy position of being able to adjust the production of their aircraft according to the market without serious reflection on their financial position. By virtue of this the production of the successful little two-control Ercoupes is going ahead according to the flow of orders, and work on the prototype Airsedan is also progressing.

ISLAND BASE

Visit to Darrell's Island: Future of B.O.A.C. Bermuda-Baltimore Service

"Flight" Photographs



A Boeing type 314A flying-boat takes off for its 5-hour flight to Baltimore. The hills of the mainland seen in the background provide natural shelter for the flying-boat base at Darrell's Island.

The control tower and part of the terminal building at B.O.A.C.'s Bermuda Airport. The hangar behind the control tower is used for stores and maintenance.

"Berwick" riding at anchor by the landing wharf. It is one of three Boeing 314A's purchased from Pan American World Airways by B.O.A.C. in 1941. Maximum all-up weight is 82,000 lb.

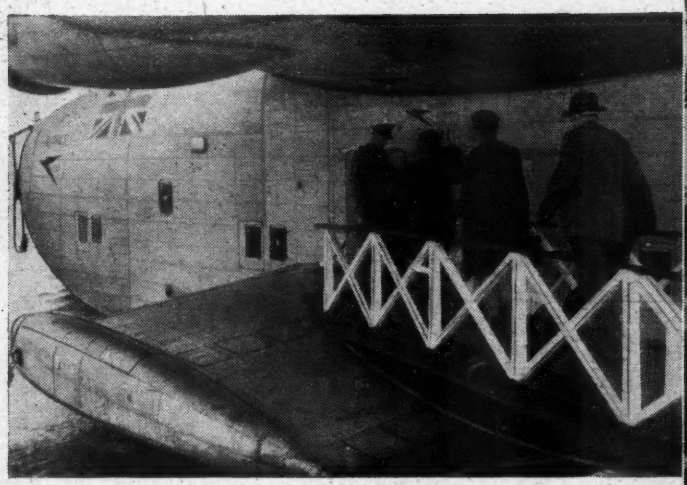
Passengers going on board the "Berwick" prior to their departure for Baltimore. The deep water enables flying-boats to taxi alongside the wharf, thus obviating the use of launches.

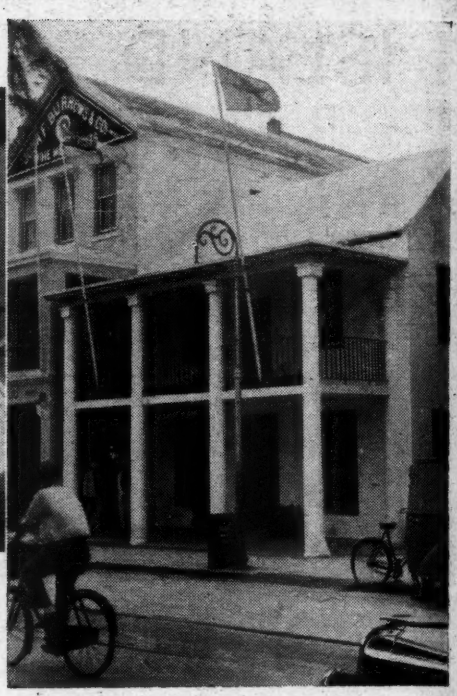
TEN years ago Imperial Airways, in conjunction with Pan American World Airways, opened the route from Bermuda to Port Washington, Long Island, with Empire-class flying boats. The American company used Sikorsky Clippers and the service was run four times a week, with Darrell's Island as the base of operations in Bermuda. The service was continued by Imperial Airways with one aircraft, *Cavalier*, until it was lost after making a forced landing on the sea in January, 1939. The American company, however, continued alone until the British trans-Atlantic passenger service with Boeing 314s was started in May, 1941, through Lisbon, Bathurst, Belem, Trinidad and Bermuda to North America. Baltimore was then selected as the North American base for convenience of serviceability and also for security reasons, and when the trans-Atlantic service ceased to operate, the Boeing 314s were diverted to the Bermuda-Baltimore route. There is little inconvenience to B.O.A.C. in the choice of Baltimore, as passenger traffic does not originate solely from New York, and many passengers travel from the middle west, from where connections to Baltimore are as convenient as to New York.

Darrell's Island was chosen because of the sheltered nature of the surrounding stretches of water, and Mr. Eric Wheatley, the B.O.A.C. acting Station Superintendent, told *Flight's* representative, on the occasion of a recent visit, that he had not known the weather "close in" for the past 18 months.

Bermuda, which is, of course, the "playground" for

Island Base . . . . .





(Above) The Boeing 314A has no wing floats, sponsons of wing-form act as stabilisers and also form a convenient platform when embarking passengers. (Right) The B.O.A.C.'s Terminal building in the busy main street of Bermuda.

many Americans and Canadians, has many British and Portuguese residents and a large Negro population, and it is rather interesting to note that only in recent years have motor cars been allowed. The popularity of the journey by air may be judged by the fact that between October, 1945, and June of this year, 19,657 passengers flew on the 815-mile journey, which takes, approximately, five hours. For the handling of passengers at Darrell's Island a terminal building has been constructed to provide every possible comfort and convenience, and to cause minimum delay in the handling of baggage. There are luxurious lounges, restaurants and shower baths.

Several of a special version of the Short Sandringham flying boats are being built, and will be named the Bermuda Class by B.O.A.C., for the purpose of taking over, probably early next year, the service from the Boeing 314s. The present three times a week service will, in all probability, be increased, especially in view of the smaller accommodation on the English flying boats. Since the reasons for using Baltimore will no longer exist there may be a change in the Northern terminal.

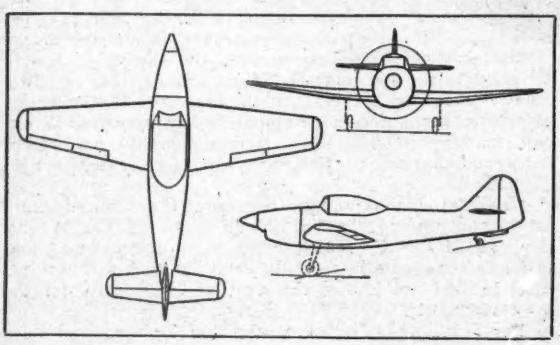
The Avro Athena

Merlin-engined Version of Advanced Trainer

DESIGNED to the new advanced-trainer formula, the Avro Athena was, like the Boulton Paul P.108 described in our issue of August 7th, originally planned for turbine-airscrew propulsion, but the first machine has been fitted with a Rolls-Royce Merlin piston engine (the P.108 has a Bristol Mercury, it may be remembered).

The Athena has behind it the very long experience of A. V. Roe and Co. in the design and production of trainer aircraft, and the power of the Merlin endows it with fighter manœuvrability. The cockpit layout is for two pilots sitting side by side and a passenger sitting behind the first pilot. The jettisonable canopy incorporates a two-stage amber screen for simulating instrument-flying during daylight.

Structurally the Athena is of all-metal construction, with a two-spar wing built in five sections and a stressed-skin fuselage split vertically along the centre line, except at the cockpit, where bending loads are taken by two longerons and the floor members.



The wheels of the wide-track undercarriage are carried on cantilever struts from the centre-section front spar and fold upwards and inwards into the leading edge. The steerable tailwheel oleo leg is linked to the rudder control, but a clutch can be disengaged by a lever in the cockpit.

Radio equipment includes transmitter receiver 1143A, Standard Blind Approach or Rebecca Mk. IV for Babs approaches, and R3121 for identification.

Two fuel tanks, normally carrying a total of 130 gallons, are carried in the centre section, and two drop tanks, each of 45 gallons capacity, can be fitted under the centre section.

THE GOLDEN HIND RETIRES

THE last of the largest class of British flying boats ever operated has been taken out of service. The Golden Hind was one of the three G-class boats purchased from Shorts by British Airways in September, 1939, but before being used was, with the others in the class, handed over to the Air Ministry for use by the R.A.F. Only 200 hours were flown by the Golden Hind from that time until July, 1941, when she was returned to B.O.A.C. and put into service for the first time on the Foynes to Lisbon shuttle run. In July, 1944, another transfer took place, this time to Durban for operations on the Cairo-Durban-Kisumu-Seychelles route. At the end of 1945 the flying boat was returned to England and sent to Short and Harlands at Belfast for an extensive overhaul. In September, 1946, she was put back into operation on the Poole-Cairo-Poole service, Capt. Dudley Travers commanding her for the major portion of her remaining flying hours.

The Golden Hind was powered by four Hercules XIVs, had a span of 134ft 3in, measured in length 103ft. 2in, and in height 31ft 8in. Maximum all-up weight was 74,500 lb

A New Ideal

What are the Prospects of a Good British Executive Aircraft?

By SIR ROY FEDDEN, M.B.E., D.Sc., F.R.Ae.S.

DURING the last few weeks I have had this query put to me by three separate managing directors of large British industrial concerns. Two of them were pilots in the R.A.F. in the 1914-1918 war; all of them have done a lot of business-flying in commercial aircraft prior to and during the last war; two have made air crossings of the Atlantic on business of national importance during the last war; and all are hard-headed, practical realists who have had their forced landings and fair share of narrow shaves in aviation. Nevertheless, they are keen to continue to employ flying for their business contacts, but are not prepared to take the present risks, either for their executives or themselves.

All have said to me: "The advantages of having a suitable private executive aircraft for our company are so obvious that we cannot pass them over, but we are much too old hands at the game to allow our executives to use regularly the aircraft at present available. There is not one that in our opinion fills the bill for a company such as ours, and we want to know your opinion as to whether the state of the art is such that, if one were to start afresh from scratch, it would be possible to produce such a machine; how long would it take to develop; what would it sell for in production, and what would it cost to maintain on a proper basis with a qualified professional pilot?"

I replied: "If you will tell me in a little more detail what you consider is wanted, and what is lacking at present, then I will do my best to give you the answer." I spent quite some time getting their various opinions carefully sorted out into an understandable form, and although you can seldom get any three people to agree on what they think is an ideal specification for a fishing rod, a golf club or a motor car, and that therefore it is unreasonable to expect that you will get entire agreement on what is the goal to aim at on the perfect executive aircraft, nevertheless, after tabulating their various requirements and endeavouring to interpret their different views into practical form, I have made a compromise proposal that is, I believe, fairly representative of what all three think is necessary. Which was as follows:—

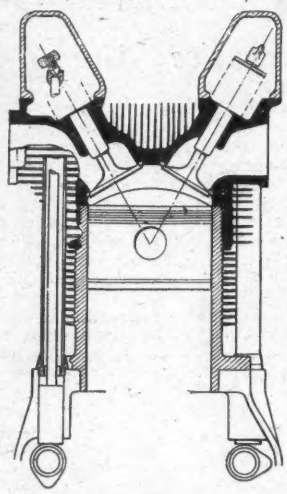
The author.

FOR the title o this article Sir Roy Fedden might well have chosen the words "To Start You Thinking." The suggestions which he puts forward are certainly provocative of thought and argument. The two aircraft designs may be said to represent the engine designer's rather than the aircraft designer's point of view, but their aerodynamic efficiency is appealing if the mechanical problems are not too great.

1. It is interesting to note that all wanted a considerably more intimate and closely arranged vehicle, more like a modern saloon car than a motor coach. With this I agree; it does not make the design proposition easier, but it is less weight of aircraft, and therefore should make for less cost.
2. There must be room for four passengers and a professional pilot in comfort, so that trips of five hours' duration can be undertaken without being cramped or inconvenienced, and there must be a proper lavatory.
3. The next point was that there must be readily accessible accommodation for not less than 200 lb of luggage.
4. The machine must have a high enough cruising speed, not less than 200 m.p.h., at an operating altitude of, say, 10,000ft.
5. The still-air cruising range must not be under 1,000 miles to allow for bad weather and an effective range of 600-650 miles; and there must be sufficient power at altitude to cruise at the required speed without pressing the engines too hard.
6. There must be blind-flying equipment, and the latest proven aids to bad-weather flying. I believe these requirements are difficult, as any of the methods of blind pin-pointing with accuracy require a separate operator, and also at present are heavy, but I understand that during the next three or four years we may expect considerable changes and improvements in this respect.
7. The aircraft must be really safe in the practical sense of the term. It must, in fact, be much safer than any existing conventional twin-engine machine and must be able to climb and fly strongly on one engine. This is interpreted to mean full I.C.A.O. requirements.
8. The machine must have a very low landing and stalling speed—these points require a good deal of definition.
9. There should be a wide-track undercarriage.
10. Fire-proofing must be improved on present accepted practice, including fire extinguishers, tanks, pipelines, etc. I agree with this point, and it entails fuel injection to the engine, a desirable feature for other reasons.
11. Servicing and maintenance must be practical and good to ensure maintenance costs being kept within reasonable limits. Objection is not taken, however, to the American automobile psychology of servicing, i.e., adjustment of certain prescribed components to a strict schedule, and if beyond these, change the component. This I agree with as sensible, especially on the power-plant side.
12. Some searching questions on the professional pilot were put to me. Can a man be kept happy and keen on his job and retain his enthusiasm? Neither upkeep charges nor size of machine will allow of carrying an engineer. Can a sufficient number of the right type of man be found, with the correct mental training, and will he at the same time be a practical engineer, willing to take his coat off when it is necessary to do so? There was a general feeling that the Service pilot was rather disinclined to this sort of approach, or to dirty his hands. I think this is a relevant point, and one over which there has to be a distinct change of heart if this machine is to be a practical proposition. I agree with these views, but consider the right man *can* be found. He wants, in my opinion, to be a different breed and to be more in the category of the mercantile or yacht skipper of a modern surface power craft. I would not recommend a reduction in salary. The job is worth £1,000 per annum, but the man has got to take a more intimate and responsible view of his aircraft than is usual. If he did this, there is no question about his being bored or not having enough work to do; in fact, he will be on the go the whole time.
13. The price of the aircraft, complete, must be £7,000 to £10,000 and the running expenses, including a professional pilot and first-class maintenance, should not exceed, for a reasonable mileage of about 100,000 miles, a total of £5,000 per annum. This is a pretty tall order, and I am afraid these figures cannot be met, but more of this later.

Having weighed these various points up carefully, I came to the conclusion that these people, broadly speaking, knew what they were after, but were putting me through a pretty stiff examination and asking for something considerably better than has ever been seen in Europe before in the executive or charter type of aircraft. I knew of certain experimental machines that were being made in America which approached this specification in several respects, but they were not by any means ready for everyday use, and some of them had already developed defects which would rule out the possibility of them coming to fruition.

After further consideration, I have come to the conclusion that such a machine as these business men have asked for is possible, with certain reservations, providing it is conceived on an entirely new basis, but that there cannot be a satisfactory answer to their points so long as



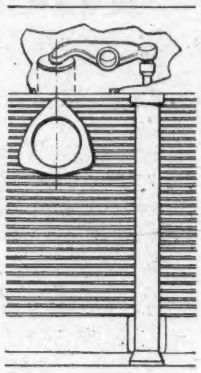
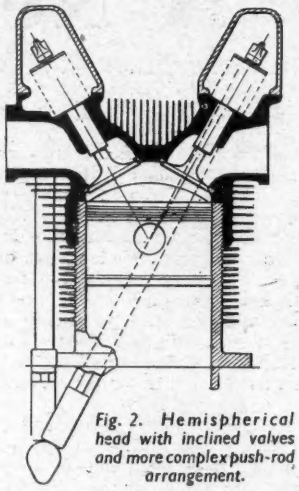


Fig. 1. Typical air cooled cylinder assembly with vertical push-rods.



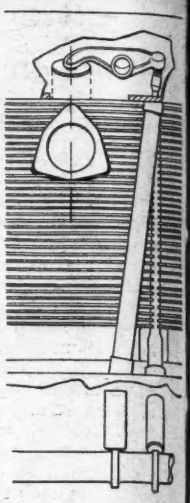


Fig. 2. Hemispherical head with inclined valves and more complex push-rod arrangement.

A New Ideal . . . .

it is on present traditional lines, with tractor nacelles mounted on the leading edge of the aircraft. This layout of the conventional twin-engine type of machine is always problematical in the event of one engine failing, and the drag is too high and means using a lot of horse-power. The American Beechcraft Executor, with its twin-engine radials, traditional nacelles and a total horse-power of 900, would definitely meet this specification in most respects, but the weight and size, first cost and operational costs of this aircraft would be far too high to go down in this country or meet my friends' specification of costs. A traditional machine of this kind would have a first cost of £15,000 in England, and the running cost would be considerably higher than their top limit. It is the same old story of the American and British motor car; the "large, powerful" way is the easier way, but it is not the most economical and most efficient, and you pay for extravagance much more heavily in the air than on land.

200 m.p.h. on 500 h.p.

Starting with the power plant, which fundamentally affects the prime and running costs of the machine, we have got to do 200 m.p.h. cruising speed, with 500 h.p. total and not with 900 h.p. The point at issue is: can this be done? The answer is definitely "No" with normal engine nacelles and present engine technique in these sizes, but I suggest it *can* be done by suppressing the traditional nacelle on the leading edge of the wing, putting the engines out of the way and driving through shafting. The proposed aircraft would, broadly speaking, have the following characteristics:

All-up weight	5,000 lb.
Cruising h.p. 70 per cent of T.O.	350 h.p. at 10,000ft.
Total wing area	280 sq ft.
Wing loading	18 lb/sq ft.
Power loading (T.O. power) ..	10 lb/h.p.
Total drag coefficient, cruising	0.019
Propeller efficiency, cruising ..	80 per cent.
Cruising speed at 350 h.p.	200 m.p.h.

Can a really safe aircraft be made? The answer to this is, of course, relative, but in my opinion no safe enough aircraft to meet this specification can be produced with the traditional layout of power plant because, with one engine out, there is always a couple which requires additional skill of the pilot. Under the lower flying speeds caused by the elimination of one engine, this may produce bad flying characteristics of the machine. Here again, in my opinion, the answer is to take the propeller from the conventional place where there must be a couple, and make the thrust central.

There is no other possible solution, in my opinion, and this must be tackled as an entirely new layout if my friends' ideal specification is ever going to be realized. It seems a fairly long development job and a considerable expenditure in money.

Other possible means of getting the required condition of safety following an engine failure is, I believe, the layout for a new charter aircraft recently proposed by an eminent British aircraft designer. This introduces three engines, and whereas it is a distinct possibility and meets most of the requirements in regard to safety in flying, it is not, in my opinion, the ideal way of doing the job. It must be more expensive in first cost and maintenance, and it must have a higher drag, but it may well be a sound interim measure, pending the correct solution. It would require a considerably high total h.p. The same remarks, to a greater extent, apply to a four-engine machine.

In producing what I term the real solution, I think it is essential to have practical twin-engine reliability and so arrange the mechanical layout that in the event of one engine breaking down it does not immobilize the common gear box and thereby put the other engine out of commission. It is well-nigh impossible to provide a 100 per cent solution in this respect, but I think it is feasible to do so to the tune of 90 per cent.

Dealing first, therefore, with the power plant for this ideal machine (because this I suggest, is a corner-stone of the whole job), it would seem that a completely new engine is required, and that it must be more highly rated than the accepted light aircraft engine of to-day. This need not entail a sacrifice in reliability or an increase in specific cost. It is essential, however, to take advantage of the general advance in piston-engine technique of the last decade, and to employ less bulky and clumsy engines of about 25 per cent less swept volume. This, properly designed and developed, should give greater reliability and lower fuel consumption than at

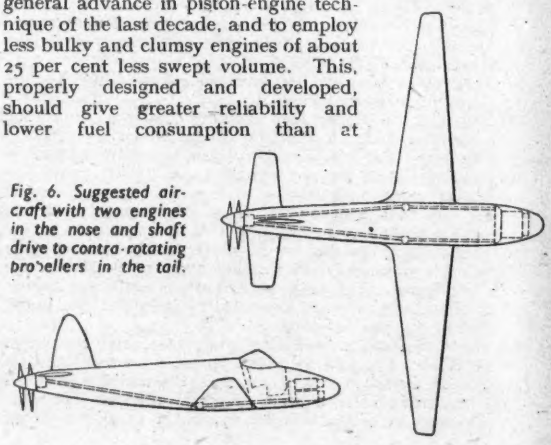


Fig. 6. Suggested aircraft with two engines in the nose and shaft drive to contra-rotating propellers in the tail.

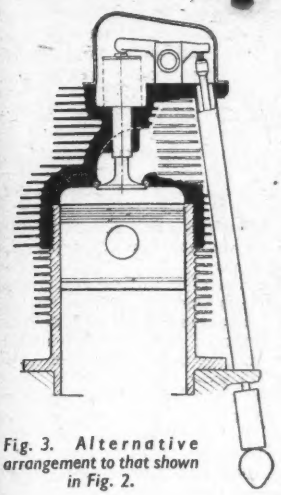


Fig. 3. Alternative arrangement to that shown in Fig. 2.

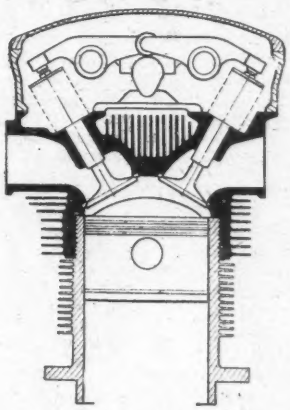


Fig. 4. Penthouse or hemispherical head with overhead camshaft.

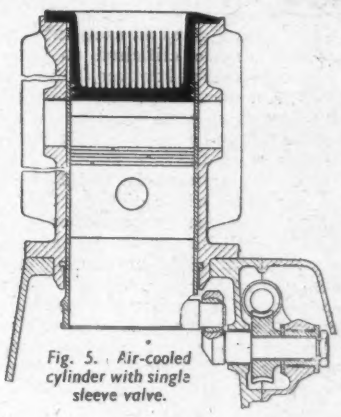


Fig. 5. Air-cooled cylinder with single sleeve valve.

present. It is not absolutely essential, but I would specify a Flat Six for this 250 h.p. engine, instead of the in-line Six, and I would suggest that it should be of about 7 to 7½ litres capacity, modern in design, about 35 h.p. per litre. The three-deep Flat Six gives better cooling—it is assumed that it must be air-cooled—and it should have direct fuel injection to each cylinder, on the score of distribution and fire risk.

We now come to the vexed question of how can we get complete reliability from such a size of engine, and adequate cooling that will give us 700 or 800 hours between overhauls? My answer to this, most definitely, is that it is impossible with the accepted vertical push-rod rocker gear. The alternatives are a penthouse or spherical head, with inclined valves and more complex push-rods; or an overhead camshaft; or a Burt McCollum single-sleeve valve. Here I know I am strongly prejudiced in favour of the sleeve valve, but a little further investigation will show that there is a good argument for this type of valve mechanism for an air-cooled aircraft engine, and if this is not accepted, then a more expensive, spherical-headed poppet-valve type must be selected. The accompanying diagrams illustrate my point.

Advanced Cylinder-head Technique

To have this aircraft functioning efficiently, we want to be able to cruise with about 350 total h.p. continuously from the two engines, and still have 700 or 800 hours' life between overhauls, and we must have good fuel consumption. This means a good deal more advanced cylinder-head technique, with maximum cylinder temperatures under 200 deg C, and a cruising consumption at 65-70 per cent take-off power of 0.44 lb per b.h.p. hour. These are considerably better figures than are common practice to-day. They can be achieved, it is believed, with complete reliability with the very latest poppet-valve technique, but when you have done this you have got an engine which is just about as expensive as a sleeve valve to make, is not as silent, and costs more in maintenance. A good example of an air-cooled aircraft engine with a good but expensive air-cooled valve gear, such as I have outlined, is the American Ranger. I would, therefore, lean towards the sleeve valve as being the best all-round solution.

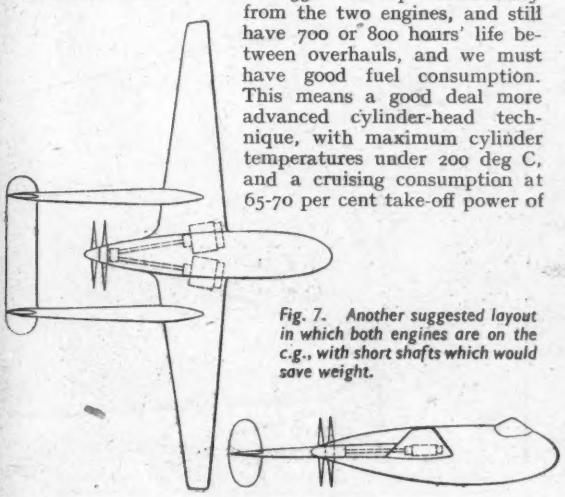


Fig. 7. Another suggested layout in which both engines are on the c.g., with short shafts which would save weight.

From these comments, it will be clear, I hope, that in order to achieve this ideal aircraft one of the first bedrock points is to provide an engine of better thermal efficiency. This necessitates a new form of valve gear, a shorter and stiffer unit of smaller capacity, and a better consumption than is general practice to-day in this category of engine. Although 250 h.p. is not too much to take from a six-cylinder engine, it is just about enough, and although a six-cylinder, in-line might well do this job with up-to-date valve gear and adequate cooling, I would personally lean to the opposed Flat Six, as I think the cooling is easier and the crankshaft system is certainly easier, seeing that gearing will have to be introduced into the system.

Now if we are to take the engines away from the traditional place on the leading edge of the wing (and I have no doubt in my mind as to the necessity of doing this), where are they to go? At first glance it would appear that inside the wings is the right place but, after discussions with practical aircraft designers, one does agree that this presents difficulties from their point of view. Accessibility is not good—although I am not so keen about engine accessibility *per se*, and I think it is apt to be an over-estimated quality. You want to be able to get at the magnetos, sparking plugs, fuel injector and engine accessories; after that I suggest it is better to be able to whip out the engine quickly and simply. If you are going to take the engines away from the traditional place on the leading edge of the wing, you naturally have to be careful not to upset the aircraft designer from the balance point of view. And to introduce complications which would entail carrying ballast, etc., when the machine was flying light would be a fatal handicap.

Some considerable thought has gone into the layout of such an aircraft from the power-plant installation and balance point of view, and of eleven possible alternatives that have been studied, diagrams 6 and 7 seem to be the most promising. No 6 provides for the two engines in the nose, with very accessible cowling, which can be made of the "alligator" type and which can be opened complete and immediately for inspection and servicing. The layout entails long shafting and some considerable development, but most of these problems have been dissipated by the electronic art of strain-gauging.

The second machine, shown in diagram No. 7, has the engines on the centre of gravity, requires all the passen-

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gers to be ahead, gives an excellent view, but entails twin booms and may be criticized on the score of danger in the event of a crash; however, I think this may be written down with modern design and the introduction of a nose wheel. The twin boom machine provides far better protection for the propeller and safety for the passengers when the machine is on the ground.

A good deal more study would obviously be necessary really to explore which of these two layouts is the more profitable, and also whether there is not a better one still, but on similar lines. At any rate, it is submitted that such an aircraft would meet, generally speaking, the requirements of my three friends. It would give the cruising speed and fuel consumption which is required, with a moderate-sized instead of an over-sized engine; and it would provide the considerable advantage of central thrust in the event of an engine failure. The other characteristics of the machine asked for in the ideal specification could all, I think, be met by careful investigation and design. I have not attempted to deal with them in these notes, as they are, in my opinion, incidental to the new basic layout which is required to give the big cuts that are necessary to achieve the required results with an economic expenditure of power.

Neither of these suggested layouts is, of course, original. The twin-boom machine has been designed and illustrated, and emanates, I think, from France; the other type of machine has been illustrated and prototypes built in the Douglas "Cloudster" in U.S.A., but the engines are in a somewhat different position. I have simply recorded these layouts as being the best approach I can see at the present time to provide the answer to my friends' requirements, having agreed with them and made up my mind that no existing form of aircraft will give them exactly what they want.

We now come to practical politics on the financial side. How long would it take to develop this aircraft and engines with their shafting; when could the machine be in production; what would it cost, and what would be the selling price? My guesses on these points would be as follows:—

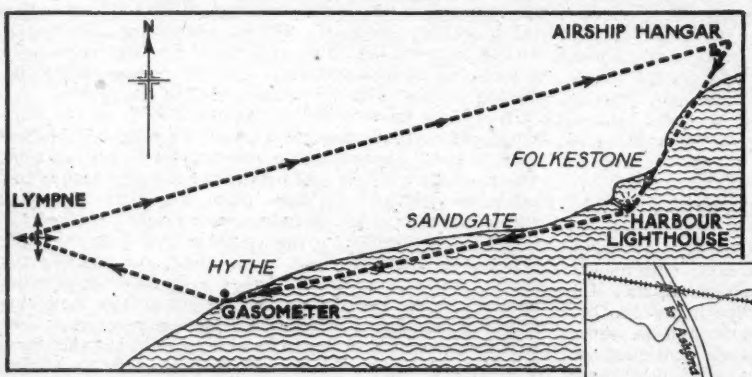
1. The time needed for this development would be three years.
2. To build and test-out a prototype aircraft would cost £250,000.
3. The machine could be in production in four years from now.
4. If the design was right and the price was right there might be a steady sale for this machine for a period of years of at least 500 machines.
5. Allowing for the amortization of prototype and tooling, and assuming that materials and wages have not increased by the time of production, it is suggested that this machine could be produced and sold with an adequate works profit, agents' discount, guarantee cover, etc., for a net figure of £11,500.
6. The running expenses, including depreciation, insurance, maintenance, interest on capital, fuel, oil, etc., are estimated at £7,980, or 1.06 shillings per mile, on a basis of 150,000 miles per annum.

The point at issue is whether, at these prices, there would be a sufficient market for this machine at home and abroad if we emerge satisfactorily and in reasonable time from the crisis in which we are now involved. It is certainly a gamble, but something drastic of this sort is, it is suggested, the only way of giving my friends the type of machine which, with all their experience and flying background, they say they must have. Anything short of this will not give them the answer.

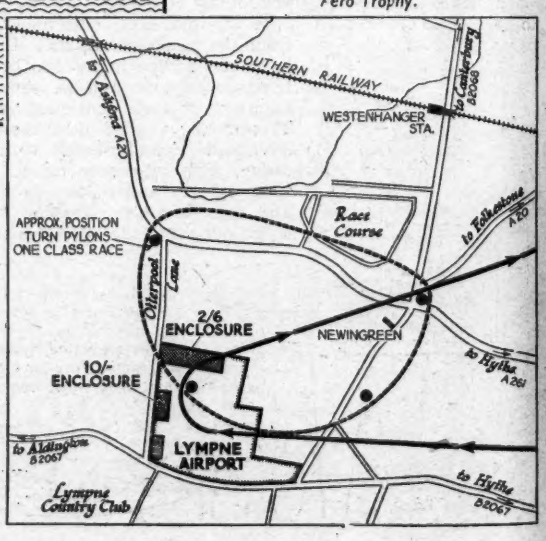
I am quite sure I have not yet probed the whole proposition far enough, and there may be other solutions as good as, or better than, those which I have suggested in these notes, but it might be interesting and instructive to have this matter further ventilated.

Folkestone Two-day Meeting

Good Entry List for Four Races



(Left) The course for the Folkestone Air Races. (Below) A map showing the best approaches to the airfield. The dotted line represents the approximate course for the Tiger Moth race and the heavy line indicates the Lympne turning point for the High-Speed Handicap and the Folkestone Aero Trophy.



ONE of the most outstanding events of the aviation year will take place over the coming week-end August 30th-31st, when the Cinque Ports Flying Club, Ltd., holds its Tenth annual Lympne International Air Races.

The heats will be flown on Saturday, starting at 2.30 p.m., and the finals start at 2.30 p.m. on Sunday. Visitors arriving at Lympne by air on either of these two days are requested to land before 2 p.m., and aircraft not taking part in the meeting are well advised to keep clear of the area during Saturday and Sunday.

Two enclosures (10s and 2s 6d) are being provided for the public, and the map reproduced on this page will help to indicate the best approaches to the airfield.

The races are divided into four main events; competitions for the Folkestone Aero Trophy, the Siddeley Challenge Trophy, the Lympne High-Speed Handicap Race, and a one-class scratch race for Tiger Moths. Turning points on the 19½-mile course remain the same as in last year's races, namely, Capel Hanger, Folkestone Harbour, Hythe Gasometer and

(*Continued on page 229*)

HERE AND THERE

THE GREAT AND THE SMALL: Designed and built by Mr. Irving Prue (in picture) this all-metal glider was constructed mainly from a drop tank of a P.38. The V-shaped tail enables it to land without becoming entangled in weeds or brush.

American Awards

GROUP CAPTAIN JOHN D. BAKER-CARR and Dr. E. Talbot Paris were among 32 British scientists to receive American awards and decorations from the U.S. Military Attaché, Major Clayton Bissell, at the American Ambassador's residence on Thursday, August 21st.

During the war, G/C Baker-Carr, who received the Legion of Merit degree of Officer, was head of the Aircraft Development branch in the Ministry of Supply and chief of the British Air Commission in Washington.

Dr. Talbot Paris, who received the Medal of Freedom with Bronze Palm, was responsible for the development of radar communications and other electronic equipment.

The awards were made to scientists who materially aided the Allied cause during the World War II.

Record-Breaker for Sale

THE "Reynolds' Bombshell" aircraft that flew around the world in 73 hours 6 minutes, was advertised for sale last week. Mr. Milton Reynolds, the owner, said "it is in perfect shape to make another flight" and he asked 50,000 dollars (£12,500) for the machine.

Mr. Reynolds estimated that the two world flights made by the "Bombshell" had cost 150,000 dollars, about £37,500.

Britain's Atomic Pile

THE first atomic pile in Britain started up at the Atomic Energy Research Establishment at Harwell last week. The pile, known as the "Gleep" (graphite low energy experimental pile), is the first major unit to be completed at Harwell and has been built primarily for experimental work in nuclear physics. It has been designed largely by a group of New Zealand scientists working at Harwell. Many British scientists have contributed to the production of the pure graphite and uranium and have designed and produced the instruments required for the pile. The engineering and constructional work on the pile has been completed by the Ministry of Works and its constructors. W. E. Chivers and Sons, Ltd., and Matthew Hall and Co., Ltd., in fifteen months from the beginning of work on the site.

Down Argentina Way

GENERAL PERON, the President of Argentina, has told the people of the Argentine that their country's economic future is bright and that it is one of the five countries in the world making its own jet aircraft.

Canadian Helicopter

THE first Canadian-built helicopter made its initial demonstration flight at Dorval Airport, Montreal, last month. The designers, Bernard Sznycer and Selma Gottlieb, of New York, and the owners, Intercity Air Lines Company, expressed satisfaction with the performance. The Canadian helicopter has a four-blade rotor as compared with the three blades of the Sikorsky and the two blades of the Bell.

Search Ends

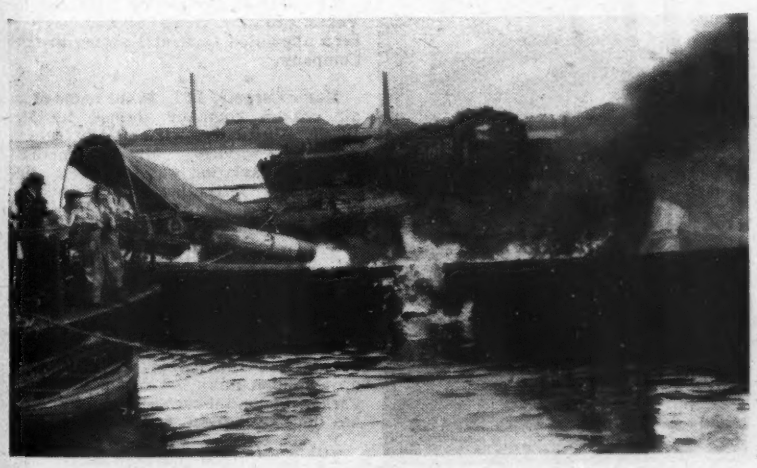
A ROYAL Australian Air Force detachment has recently completed a two-year search of New Guinea. The search, which covered 6,000 square miles, was instigated to find out the fate of airmen lost in the New Guinea jungles during the war, and in the final eight weeks' search the wreckage of six Australian aircraft, one Dutch and one U.S. aircraft were found. The wreckages of 70 Japanese aircraft were also discovered.

Marine Jet

THE Admiralty has announced that development work now in hand includes two projects for the application of gas-turbine machinery to the propulsion of warships. The first is for the development of an engine incorporating an aircraft jet propulsion unit for installation in coastal craft, and the second project is for the development of a gas turbine specially designed for marine work and with sufficient power to propel an escort vessel. The aim in developing gas turbines for ships is to reduce the weight and space used in producing a given amount of power and, ultimately, to increase the overall efficiency. It does not follow that spectacular speeds will result from the introduction of gas turbines.

Jet Dredgers

IT is possible that jet aircraft engines may soon be in regular use to clear mud from the bottom of the River Thames if experiments now being carried out under the auspices of the National Gas Turbine Establishment of the Ministry of Supply are successful. The first of these experiments took place last



FIRELIGHTER: Another use for jet units was demonstrated at Crossness, near Abbey Wood, last week, when experiments were carried out to try and burn several of the old derelect barges which now impede the waterway. The picture shows the operation in progress.

HERE AND THERE

week in shallow water, and a hole measuring 8ft square × 4ft deep was blown in the bed of the Thames. The engine used is a W2/700 Gas Turbine of the type which, last winter, succeeded in dispersing a 30ft drift of snow 6ft deep in less than a minute. At the present time over a million tons of mud has to be dredged from the river bed each year, and the present dredging system succeeds in clearing only the surface of a mud bank. It is believed that the use of the jet engine will enable mud to be cleared as far down as the bottom layer.

Rocket Mail

THE Belgian authorities were due to carry out the first test in the transmission of mail by rocket at Ostend on August 24th. A self-contained rocket container, which was manufactured in Holland, was to be fired in the direction of Bruges. The rocket is constructed entirely of wood and has an overall length of about 6ft. A special stamp is to be introduced to commemorate the first rocket delivery.

Praga-Powered Cub

IT is the practice of Czechoslovakian flying clubs to fit all their club aircraft with engines of National design, thus facilitating maintenance and simplifying the distribution of components. Following this policy, they have recently converted a considerable number of Piper Cub aircraft, which were purchased from the American Army Air Force, to take the 75 h.p. Praga D four-cylinder horizontally opposed engine. Few difficulties have been encountered in effecting the change and although the Praga D installation is not as neat as that of the usual Continental fitting, the additional 10 h.p. afforded by the Praga D gives an improved climb and ceiling. It is also interesting to note that the 150 h.p. Praga E eight-cylinder horizontally opposed engine, developed from the Praga D, is being installed for flight trials in a Messenger.

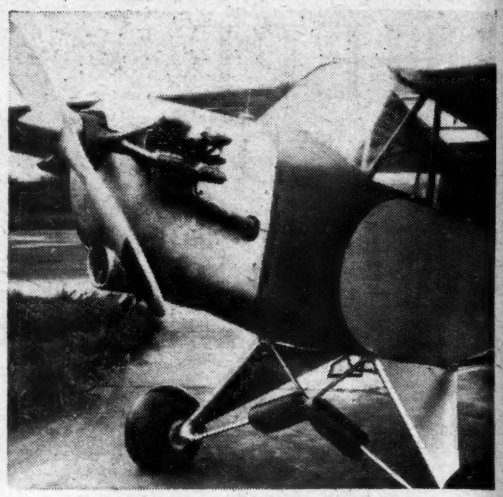
Conversation Piece

AT the Essendon (Victoria), the Mascot (New South Wales), and the Archer Field (Queensland) airports in Australia, plans are being made to record the radio conversations between pilots and control tower officers. The idea is to eliminate time - consuming entries by busy control officials and to provide a verbatim reference record in the event of an accident.

Swedish Flying Ship

TWO young Swedes have designed a water-skimming ship which, upon reaching a speed of 8 to 9 knots, lifts partially out of the water, keeping contact only with its stern and two floats in the front. The craft is fitted with a single 18 h.p. engine which produced a speed of 24 knots during recent trials. Stockholm radio reported the invention, and stated that it may prove to be a prototype of flying ships which will carry five hundred passengers.

Sweden is not alone i. this type of development. At Cowes, Mr. Christopher Hook is hard at work developing his Hydrofin, and recent model tank test at the R.A.E., Farnborough, indicated that lift by hydrofoils may be combined with stability, a feature which has been lacking in previous attempts.



POWER CHANGE: The machine pictured above is one of several Piper Cubs purchased by the Czechoslovakian government and adapted to take the 75 h.p. Praga D. engine. A fuel tank with a capacity of 8 imp. gal. has also been added to the Piper, which increases the range to 360 miles.

Abandoned

ALTHOUGH no official announcement has been made, rumours indicate that the Douglas Aircraft Corp. has abandoned its plans for the five-seater Cloudster executive type of aircraft. The machine was designed to sell in the United States at a top figure of 30,000 dollars, but post-war increases in production costs have sent the price up to 68,000 dollars, which makes manufacture of the Cloudster an impractical proposition.

News in Brief

Auction sales of Government miscellaneous stores and plant held by the Ministry of Supply in various parts of the country have reached the £1,000,000 mark. Since the auction sales began a year ago, a monthly average of £87,830 has been returned to the Treasury.

* * *

The former Production Manager for Vokes, Ltd., Mr. H. F. Osborne, has now been appointed General Manager of that Company.

* * *

Magic Carpets, Ltd., is the name of an air charter company formed by Mr. W. J. Abernethy, who already runs a car hire service. Mr. Abernethy's interest in aviation was sponsored principally by instuction and flights he received from the Wiltshire School of Flying.

* * *

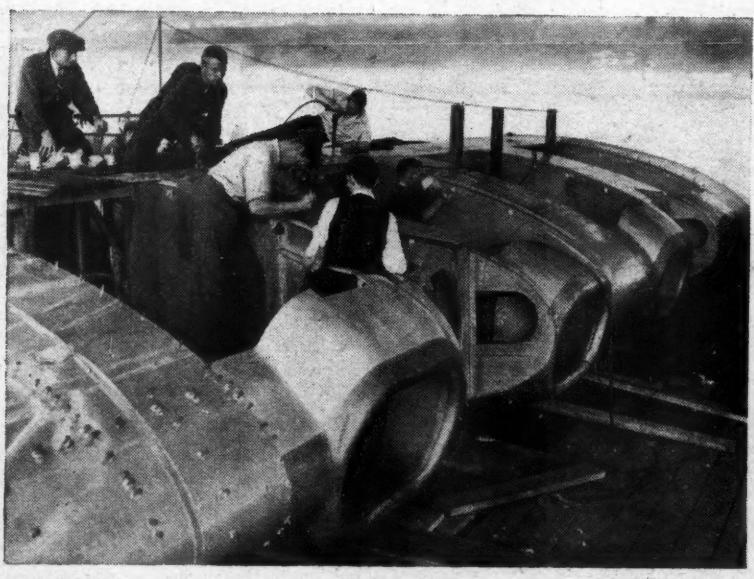
S. J. Patmore and Partners have taken over the management of the Vanguard Engineering Co., Ltd. Mr. S. J. Patmore has been appointed managing director.

* * *

Latest of B.O.A.C.'s pilots to chalk up a million miles is Captain Victor G. Parker, of Southbourne, Hampshire. He has done over 9,000 hours' flying.

* * *

The date of the Battle of Britain Air Display Organized by the R.A.F. Association (Yeovil Branch) has now been changed from September 14th to September 20th.



MAMMOTH: Some idea of the size of the Brabazon I may be gauged from this recent picture taken at Filton where the aircraft is reaching the final stages of the first phase of its construction. Centaurus engines, driving contra-rotating airscrews are to be fitted.

Miles MERCHANTMAN

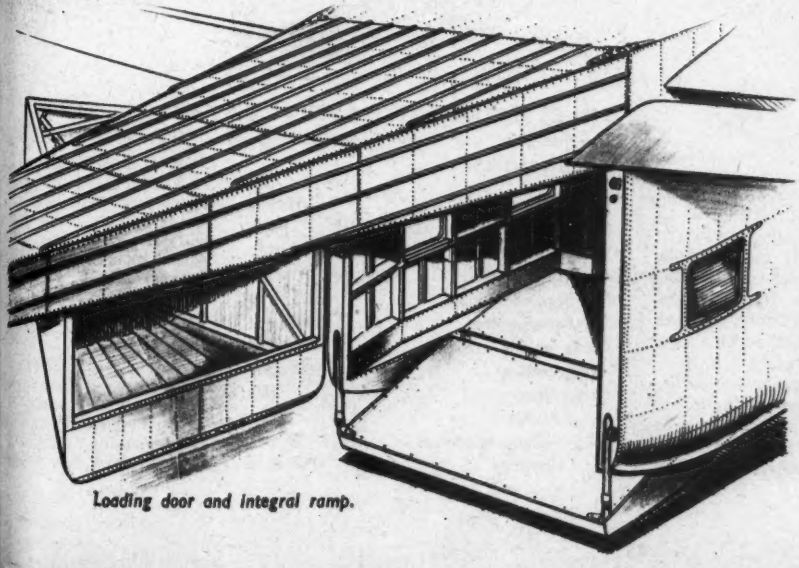
Four-engined Pantechnicon with Two-ton Payload : Robust Simplicity

THE wide success enjoyed during the past two years by the Miles Aerovan is to some extent an earnest of the reception which almost certainly awaits its larger descendant, the Merchantman. Miles Aircraft, Limited, when surveying the post-war commercial aviation potential, very logically came to the conclusion that the transport of goods by air called for specialist aircraft. The Aerovan was designed to meet the several requirements peculiar to that type of traffic. That the formula was right is now established beyond question, and it is but natural that a larger machine intended to cater for loads beyond Aerovan capacity should be laid down on similar lines. Thus came the Merchantman, in effect an all-metal "plussed-up" Aerovan with more than double the payload and over three times the power—this latter being spread among four engines.

Probably one of the most valuable features of the Merchantman is its sheer simplicity. It has been designed from the inception to be a "production job" in the fullest sense of the term—simpler even than its smaller prototype, and that is saying a good deal. In view of the pressing —even vital—need for the maximum production of British aircraft for export to world markets none can well depreciate the value of design for rapid manufacture. In this particular instance, of course, the physical shape of the Merchantman, whilst being ordained by the purely functional ends to be served, is such that considerations for easy production are greatly simplified.

In essence the aircraft can be regarded as being divisible into two fundamental units: a wing carrying the engines, which with the tail boom and empennage form the "flight" unit, and, hung from this, a fuselage in the shape of a large-volume container which forms the "utilitarian" unit. Just how well the latter appellation is deserved is indicated by the fact that, for the relatively modest all-up weight of 13,000 lb, the Merchantman provides a useful cubic capacity of 780 cu ft for the carriage of no less than 5,000 lb of freight. There are few aircraft, of any class, in existence which have a tare/gross ratio of 38.4 per cent. Such is the value of specialist design.

Like the Aerovan, this large machine has a rear loading door, but the threshold is



Loading door and integral ramp.

MILES MERCHANTMAN . . .

formed by the trailing edge of an integral hinged part of the floor, which can be lowered to make a ramp, so facilitating the handling of cargo. In this connection it is worth noting that the cabin floor is but 2 ft above ground.

There is little need to dilate upon the possible uses to which an aircraft of this character can be put. It is sufficient to mention that it can rapidly be converted to a 20-seater passenger aircraft or, equally, can be used as a horsebox, air ambulance, operating theatre, mobile workshop, or flying classroom. As a horsebox it is more than likely that the Merchantman will find widespread employment, since two racehorses can be accommodated with ample comfort, not least of which is generous headroom; additionally, the horses could be led into their stalls and out again without having to be backed. It has already been established that horses suffer little discomfort in being transported by air, even during bad flying weather, and a great inducement to this form of transport is that they can be raced very shortly after landing.

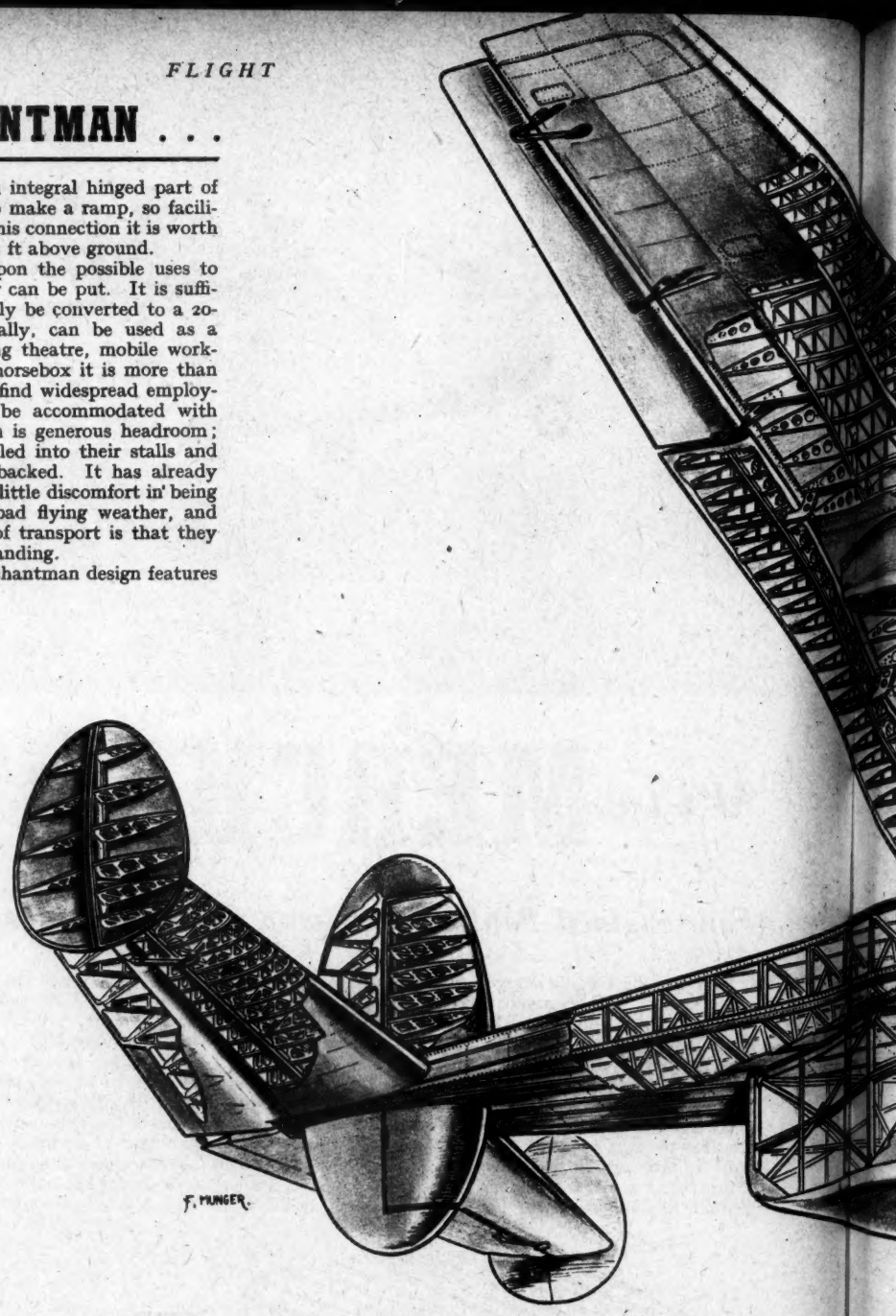
Of chief interest among the Merchantman design features are two innovations in the control field. In order to give the effect of full-span flaps, the ailerons have been designed as separate aerofoils suspended approximately in line with and largely in the manner of the flaps proper, these being of the now established Miles high-lift/low-drag aerofoil type. By a rather complicated arrangement of bell-cranks and rocking levers, the control cables for aileron operation are tied-in with the flap controls so that both ailerons are automatically given droop when the flaps are operated, yet at the same time their function as ailerons is not impaired.

Tail Trimming

It is also of interest that the normal degree of differential action introduced in aileron control is not applied in the Merchantman since the adverse yawing effect is very small. This is, of course, a facet of "suspended aerofoil" ailerons rather than of any inherent aerodynamic feature of the aircraft's physical shape.

The second control innovation is that the end-plate rudders are not rudders at all in the accepted meaning of the term. Only the central rudder is actuated by the pilot's feet; the outboard surfaces are trimming surfaces. With such keel surface area as presented in an aircraft of Merchantman shape, obviously the vertical tail surface area has to be fairly considerable in order to ensure the requisite degree of directional stability, yet in face of this the rudder area requirements are disproportionately small. Miles have, therefore, decided to try this experiment of using only the central surface as a *pur sang* rudder, keeping the trailing halves of the end-plate surfaces as trimmers. These work sympathetically, i.e., each will turn through a similar angle in the same direction at the same time and, in so doing, will relieve any control load on the central rudder.

It is a nice point for argument as to whether, when the

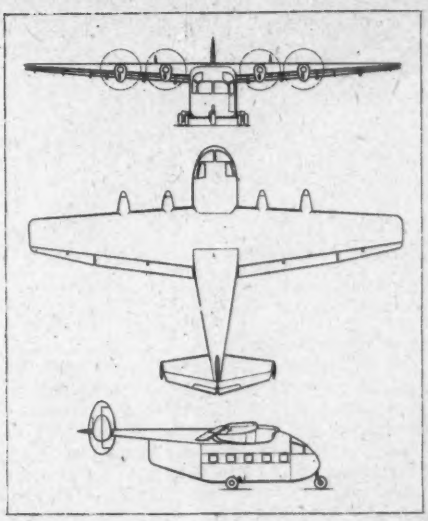


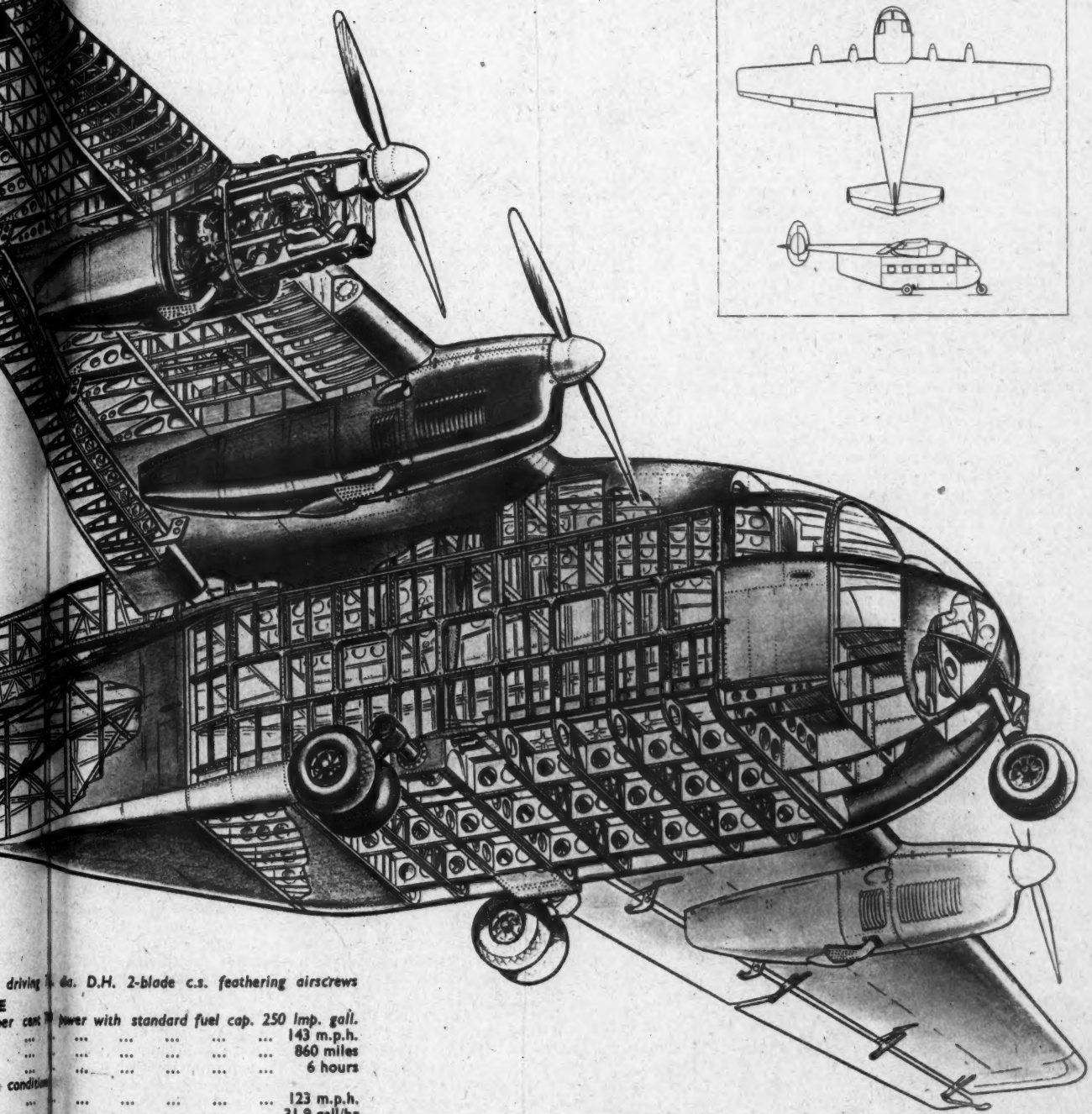
MILES MERCHANTMAN — DATA

Four de Havilland Gipsy Queen 30 engines of 250 h.p. each, driving [illegible] dia. D

DIMENSIONS	
Span	65ft
Length	42ft 9in
Height	14ft
Wing area, gross	600 sq ft
Aspect ratio	7.05
Flap area per wing	32.5 sq ft
Total aileron area	31.5 sq ft
Gross weight	13,000lb
Wing loading	21.6lb/sq ft
Cabin length	18ft
„ width	7ft 3in
„ height, minimum ...	6ft 6in
„ capacity	780 cu ft

PERFORMANCE	
At 5,000ft on 65 per cent [illegible] power	
Speed	...
Range, still air	...
Duration	...
At maximum-range condition	
Speed	...
Fuel consumption ...	...
Range, still air	...
Max speed at S.L. ...	...
„ „ 10,000ft ...	...
Cruising speed (65 per cent [illegible] h.p.)	...
T-O distance to clear 50ft	...
Min landing run from clear 50ft	...
Service ceiling	...
Stalling speed, flaps down	...



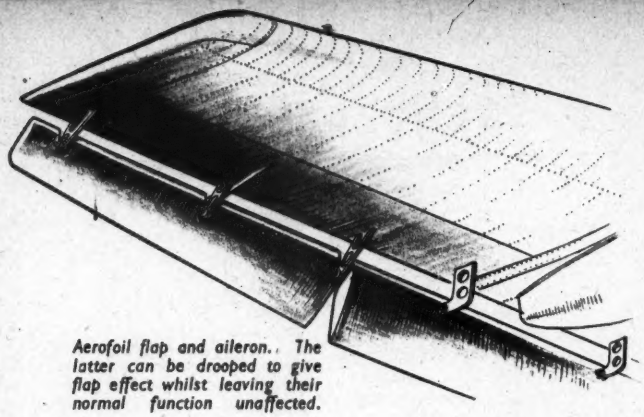


driving ... dia. D.H. 2-blade c.s. feathering airscrews

E

er cent ... power with standard fuel cap. 250 Imp. gall.	
... ...	143 m.p.h.
... ...	860 miles
... ...	6 hours
condition	
... ...	123 m.p.h.
... ...	31.9 gall/hr
... ...	965 miles
... ...	163 m.p.h.
00ft	149 m.p.h.
5 per cent (0 h.p.) at 5,000ft	143 m.p.h.
ear 50ft	440 yd
rom clear 50ft	455 yd
... ...	16,000ft
os down	60 m.p.h.

FLIGHT COPYRIGHT



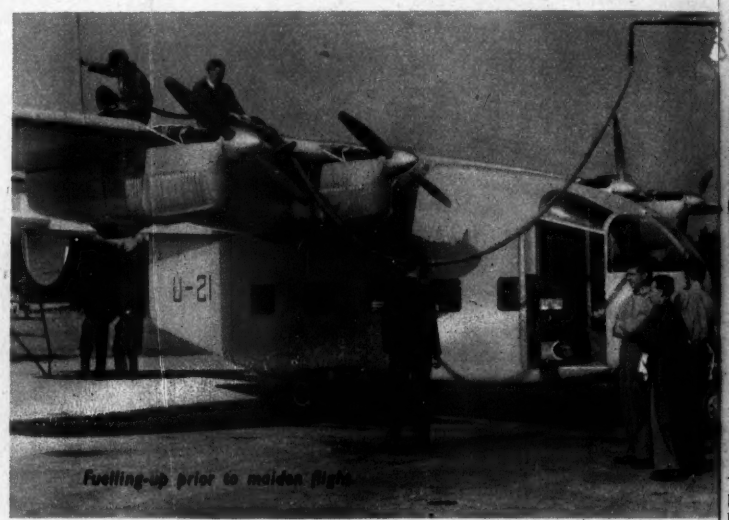
Aerofoil flap and aileron. The latter can be drooped to give flap effect whilst leaving their normal function unaffected.

trimming "rudders" are displaced, say, to port, the central rudder will take up a "no-load" position also displaced to port, albeit slightly, or whether it will remain centred on the fuselage axis. In any case, the consequent displacement of the rudder proper—if any—would be so slight as to be unnoticeable to the pilot, in precisely similar a fashion as obtains with the conventional trailing-edge trim tab. The trimming surfaces are independently yet simultaneously operated by Miles electric actuators carried in the tailplane, such units also serving a similar purpose for elevator trimming; they are controlled by operation of a rocking and rotating switch behind the throttle box in the cockpit.

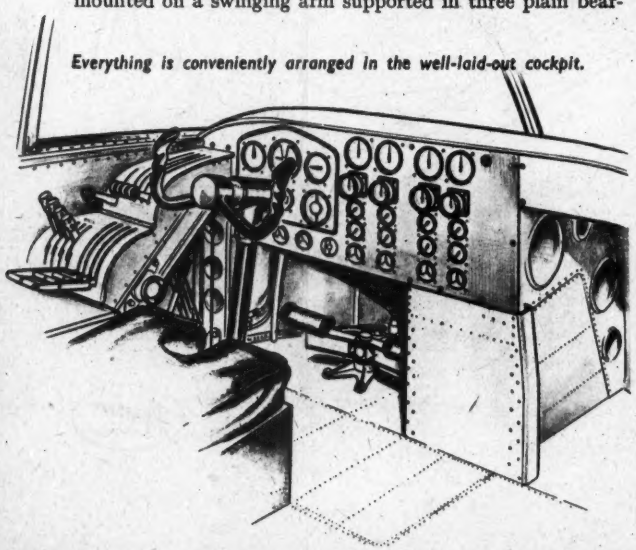
Normally the Merchantman has provision for an aircrew of one, the pilot, but should it be desired, dual control could easily be furnished or, alternatively, provision made for a navigator/radio operator; there is plenty of room. Cockpit layout is good and very convenient. There is but one novel feature here and it is surprising that it has not occurred before. Quite simply, it is uniting under one control the fuel cocks and the idler cut-outs; when the cut-outs are operated to stop the engines, the fuel cocks are closed—simple, effective, and so far as we can see, without snags. Of the field of view, it is sufficient to say that it is of the same high order as that provided in the Aerovan.

Before going on to consider structural features of the aircraft, space may be devoted to an appraisal of the undercarriage. It is in the Aerovan class for simplicity and, in fact, is broadly similar although differing in detail. The nosewheel is pivoted on a cantilever axle from an overhung fork-arm, the oleo strut being anchored in a box formation integral with the nose structure. It is steerable through a mechanical linkage from the rudder pedals or, at will, may be unlocked for operation as a castering, self-centring unit. Port and starboard main units are duplex, each pair of wheels being mounted on a swinging arm supported in three plain bearings in the fuselage floor structure. The bearings are carried in the wall and in division members of a box structure which, additionally, houses the twin oleo-pneumatic shock absorber units. Since these are below floor level no useful stowage space is sacrificed, yet access for maintenance is very good. Wheel braking is of the single-disc type, and a duplicated system of pneumatic operation is provided; that is to say, outboard wheels can be braked together, inboard wheels together, or all together. Wheels and tyres are interchangeable.

As stated at the beginning of this survey, structurally the Merchantman is very simple, this applying particularly to the fuselage. This is built up in the form of separate sub-assemblies comprising the floor, the two sides, the nose, the forward roof, and the door-cum-tail fairing. The slab sides are fabricated on vertical channel-section frames interspersed by drawn Z-section stiffeners, thus forming, in conjunction with channel longerons at top and bottom and bounding the lintel and sill lines of the windows, a grid framework to which the skin is attached. Each vertical frame is joined to the longerons by fish plates. The floor structure is relatively massive and is composed of Warren girder transverse main beams and longitudinal pressed channel-section intercostals. It is, of course, stressed for heavy point-loads.



Fuelling-up prior to maiden flight.



Everything is conveniently arranged in the well-laid-out cockpit.

Wing-fuselage attachment seems at first sight to be fairly complicated but in actual fact this is not so. The upper sides of the fuselage walls are separate sub-assemblies, which can be likened to diaphragm closure members to the wing roots, and are bounded along bottom edges with channel members which pick up the top longerons of the side panels proper. At about 7½ per cent chord the "root diaphragm" carries a vertical top-hat section post, into the base of which registers an eyebolt anchored in the fuselage frame at this station; this forms the forward attachment point.

The main spar, unlike the rear spar, spans the fuselage roof, and from its web depend two box struts, port and starboard, which extend down to connect, by means of pin joints, with built-up triangulated box frames integral with the fuselage sides. This attachment has to contend with side loads, a fact which decided its form. The third point of wing-fuselage pick-up occurs well behind the wing trailing-edge—actually at the tail boom joint. The rear edge of the "root rib" is bounded by a channel post with its web locally reinforced at the base. This is drilled for accepting the pin which anchors to it an up-projecting lug in the fuselage frame beneath.

The Merchantman wing has many points in common with that of the Marathon, apart from being of the same span and using the same basic aerofoil section. It is virtually a

Miles Merchantman . . . . .

monospar (30 per cent) structure, although at 70 per cent chord a light-pressed channel member can be considered as a rear spar. The leading edge is a D-box internally strengthened by braced formers at 6in centres. Between the engines, however, a false spar at 7½ per cent chord forms the rear closure to leading-edge nose tanks for engine oil supply. It may be mentioned here that the tail fairings of the engine nacelles, i.e., the whole portion behind the firewalls, are formed as fuel tanks.

To return to the wing structure, interspar ribs are Warren girder braced units built up with channel members, and are pitched at 12in centres. Trailing-edge ribs are diaphragm pressings throughout and, at engine bay, flap and aileron hinge stations, external doubling plates transfer load over the leading-edge, interspar and trailing edge ribs. From one rib station outboard of the roots to one rib inboard of the detachable tips the trailing edge rearward of the 70 per cent spar is fabric covered.

The tail boom is a very simple structure built up on four channel-section longerons, which are spanned by drawn round-channel booms braced by tubular struts to form Warren girders. The skin panelling has integral pressed swagings at 8in centres for stabilizing. Attachment to the fuselage is made at each longeron terminal, the upper joints being made with through-bolted transfer straps whilst the lower joints employ fore-and-aft bolted forged end-fittings.

In order to get the first prototype into the air with the least delay, the tail surfaces are of wood. Production aircraft will, however, use all-metal surfaces, and there is every likelihood that the structural form employed will be akin to that evolved for the Seabee; this has not yet been finally decided.

To sum up, the Merchantman can be regarded quite fairly as being an exceptional aircraft which, on the strength of the Aerovan's popularity, may confidently be expected to enjoy widespread employment. It has patently been designed for rapid and simple production, it is robust, and it is workmanlike. These qualities are always in demand.

Commander T. F. Caldwell, first record breaker, with the U.S. Navy Douglas Skystreak.

New Speed Records

U.S. Navy Research Aircraft

Achieves 650 m.p.h.

NOT long ago the Ministry of Supply stated that no British attempt on the air-speed record would be made this year, but that in 1948 another attempt might be made to regain the record which was at that time held by a special U.S. Army Air Force Shooting Star with a speed of 623.8 m.p.h. At Muroc, on August 21st and again on August 26th, this speed was very considerably improved by a U.S. Navy Douglas D-558 or Skystreak. The task of bettering the latest record speed of 650.6 m.p.h. (subject to F.A.I. homologation) will be a very formidable one. The fastest run over the 3 km course during the attempts is reported to have been made at 653.4 m.p.h.

The Skystreak is one of two such machines ordered by the U.S. Navy for high-speed research, and the type was announced and christened early this year. The construction is quite conventional but there are several interesting design features. The engine is a General-Electric TG-180 axial-flow turbo jet, a type which has a maximum power rating of 4,000 lb thrust.

DOUGLAS 558
General-Electric TG-180
(4,000 lb thrust)

Span	25ft
Length	35ft 1½in
Height	12ft 1½in
Wing Area ...	150 sq ft
Wing Loading ...	65 lb/sq ft
Gross Weight ...	9,750 lb

Extensive use is made of magnesium alloy for the fuselage structure. The whole nose section is jettisonable, and in emergency the pilot would free his cockpit from the rest of the aircraft, wait for speed to decrease and then bale out, more or less normally. That portion of the fuselage which is not occupied by the cockpit or recording instruments is entirely taken up by the power unit and its jet pipe, internal fuel tanks are therefore confined to the small thin-section wings. Two integral tanks containing a total of 230 gallons are contained in the wings, but provision is made for two 50-gallon drop tanks to be carried. When empty these auxiliary tanks can be jettisoned with the aid of small explosive charges. The total of 330 gallons of fuel is stated to be sufficient for a flight of 90 minutes' duration.

In view of the thin section of the wing the aileron balance weights presented some difficulty, and the Skystreak is now fitted with weights of tungsten alloy with a density 50 per cent greater than lead. Space problems have also led to the use of very small wheels and high-pressure 8-ply nylon tyres inflated to 250 lb/sq in.

The whole airframe is stressed for a safe working factor of 12g and a breaking load factor of 18g. This, it is calculated, will safeguard the machine up to a Mach number of 1.

Cockpit Temperatures and Pressures

The pilot's cockpit is pressurized and cooled, sea-level pressure being maintained to 8,000ft, 8,000ft pressure to 22,000ft, and above 22,000ft a differential pressure of 4 lb/sq in. Cabin temperature which might at sea level rise to as much as 180 deg F, will be limited to a maximum of 105 deg F. The pilot sits between the bifurcated air entry ducts for the engine, the single intake orifice in the nose being vertically divided to feed through the two ducts.

The raising of the existing air-speed record first by 17 m.p.h. and then by 27 m.p.h. is a great credit to Douglas technicians and to the pilots. Commander Turner F. Caldwell, who is 33 years old, is a U.S. Navy fighter pilot. He made four runs during his record attempt, two in each direction, at an altitude of 75 metres. Major Marion Carl, who raised the record the second time, to 650.6 m.p.h., is a U.S. Marine. His first down-wind run was made at 652.6 m.p.h.

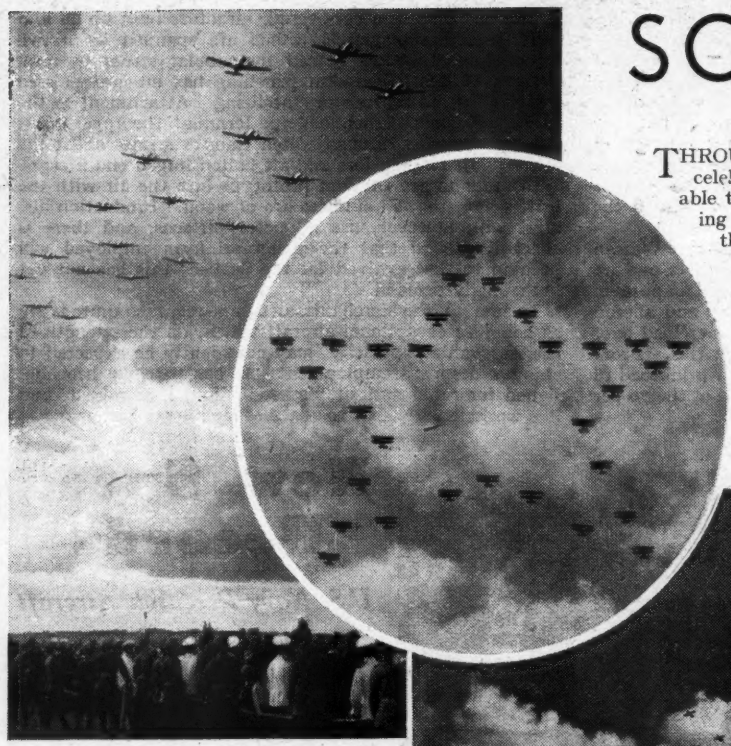
The Skystreak was not modified in any way for the records and no special fuels, injection or after-burning were used to increase the thrust of the General-Electric power unit.

Further technical details of the Skystreak and the conditions at the time of the records are awaited.

SOVIET AVI

New Military Aircr

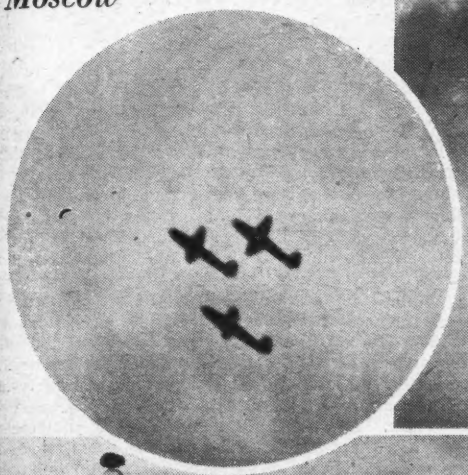
THROUGHOUT the U.S.S.R. Sunday, August 3rd, celebrated as Aviation Day. On these pages *Flight* able to present, exclusively, a series of photographs sh ing some interesting new Service aircraft and illustra the high standard of formation flying attained Soviet instructors. The display was held at Tushina airfield in the presence of Generalissi Stalin, and new types which appeared included aircraft designed by Yakolev, Lavochk Mikoyan, Gurevich, Sukhoy, Ilyushin Tupolev. Apart from the four-engined 72-se Ilyushin transport illustrated, a three-engi 67-seater is reported to have put in an appe ance. Helicopters designed by Ivan Bratuk took off and landed in spaces of 100 sq. ya

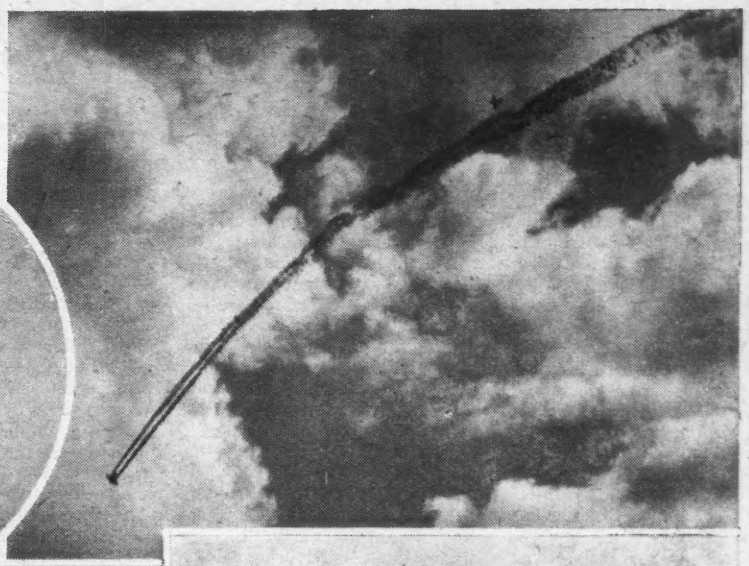


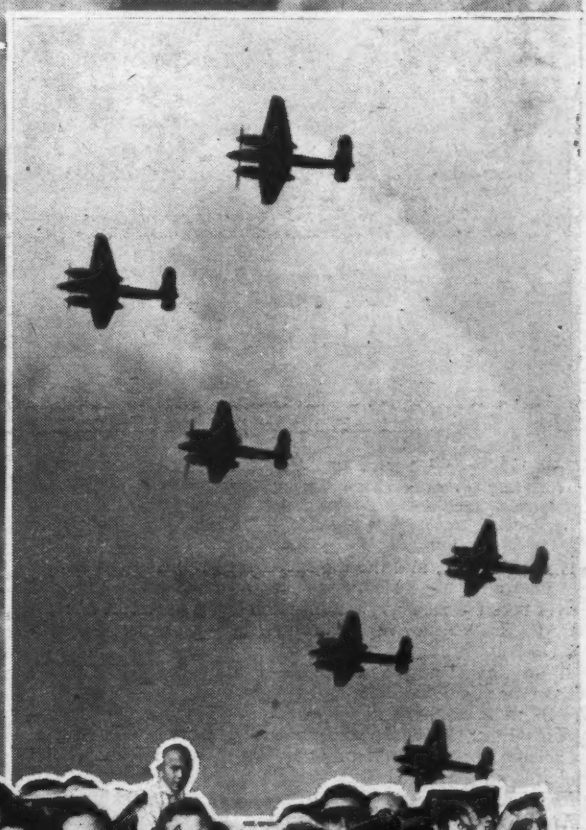
At top left is a formation of new twin-engined transports—probably IL-12s—which are succeeding the Russian-built version of the DC-3, known as the PS-84. The Soviet Star is formed by PO-2 trainers, designed by N. Polikarpov and flown by instructors, and Stalin's name is spelt out by what are stated to be UT-2 trainers, though it is obvious that two types of aircraft are engaged. The wing of the new four-engined Ilyushin 67-seater transport (lower centre) resembles that of the Superfortress and Stratocruiser. This modern type headed a fly-past of transport aircraft.

ION DAY

er Moscow







The three jet aircraft (inset circle) are described as "rocket planes" designed by Mikoyan and Yakolev, though they are probably turbo-jet powered. It is known that one Soviet jet fighter, of Lavochkin design, resembles a wartime Focke-Wulf project. Trailing smoke is an aircraft feigning destruction. Double parachutes, coloured red, white and blue, are used by para-troopers dropped from thirty-six aircraft. To the right of these are shown TUP-2 attack bombers.

American Newsletter

Accident Investigations : First Flights of Four New Aircraft Types

By "KIBITZER"

FOUR new aircraft of widely different types have flown lately. The Army have announced the flight trials and some details of the B.50, which is the Pratt and Whitney-engined development of the B.29. It is powered with four Wasp Majors which have given it an increased performance all round. Its speed, range, and climb are up, but the operational load is much the same, due to the restriction of the size of the bomb-bay, and the extra 15,000 lb load is taken mostly in the form of fuel. Other modifications include reversible pitch airscrews, increased flap area, power-boosted rudder, and thermal de-icing. It is presumably going into production in limited numbers. Boeing have also flown the first Stratocruiser.

The other Army type is of a very different design. It is the Kellett twin-engine, twin-rotor XR-10 helicopter. This has two 525 h.p. Continental engines with intermeshing rotors and an all-up weight of 10,997 lb. Its service ceiling is said to be 18,800ft and its hovering ceiling 6,000ft with a useful load of 2,793 lb The rate of climb is 1,650 f.p.m., and the top speed 121 m.p.h. at sea level.

The twin engine, twin rotor Kellett XR-10 helicopter for the American Army. There is accommodation for a crew of two and 10 passengers. Another photograph appeared in "Flight" July 24th, 1947.

The other big helicopters that are now being developed over here are the Navy's McDonnell XHJD-1, which has two Pratt & Whitney 450 h.p. Wasps, and the Piasecki XHRP-1 with one 600 h.p. Pratt & Whitney R-1340. The all-up weight of the former is quoted at 11,000 lb, and the latter as 6,700 lb.

In each of these the machine has obvious commercial possibilities, as there would be seating for 10 or 12 people. Cruising speeds would probably be in the neighbourhood of 100 m.p.h., and they would be ideal for short-haul feeder-line services. This is definitely a case where the Armed Services are subsidizing a potential commercial type—to everyone's advantage. It would be nice to hear that the Royal Air Force was equally far-sighted.

The fourth new type to fly is the Martin 3-0-3 which has done one flight. This is a pressurized version of the 2-0-2, which latter machine is now undergoing a 150-hour accelerated service trial. The idea is to do at least 10 hours per day in all weathers and at least 25 hours at night. The crew consists of both Glenn-Martin and Civil Aeronautics Authority employees, and the tests are part of the C.A.A. acceptance requirements. The original 3-0-3 specification called for an all-up weight of 35,000 lb against the 2-0-2 weight of 38,000 lb; a cruising speed of 287 m.p.h. against 263 m.p.h.; and two Pratt & Whitney R-2800 CA.18 engines as opposed to the C.A.3 engines of the 2-0-2.

REPERCUSSIONS from the three DC-4 airline accidents which were mentioned in the last News Letter continue. As a result of them the President's special Board of Inquiry has issued several recommendations which deal with length of runways, aircraft loadings, landing aids for bad-weather conditions, and the heights at which high ground should be crossed by commercial aircraft. The great differences in take-off weight between hot and cold days due to the changes in the fuel load have been re-emphasized, as have the effects of ground temperature on take-off run. The airlines are naturally watching any future regulations very carefully. With the present narrow margins on payload they cannot afford to have take-off weights reduced much more, and some serious arguments are boiling up between the operators and the Government. The installation of landing aids, however, is largely a matter of finance, which in turn is a matter of Congressional allocation. To give some idea of the gap that must yet be bridged, the President's Board has recommended installations to a value of 13,428,000 dollars; the House of Representatives has approved expenditure of 5,930,000 dollars, while the Senate, which appears more anxious to reduce taxes than improve airline safety, has approved a mere 571,706 dollars. The picture is further complicated because nobody has yet agreed as to the type of aids that should be installed!

So far as the "height above terrain" regulations go, the enquiry into the accident of the Pennsylvania Central DC-4 that hit a hill during a let-down on the Washington D.C. approach, has produced some rather startling evidence regarding altimeter error which is still being examined. But as a result of the Special Board's recommendations, the Civil Aeronautics Board has taken immediate action to make "terrain proximity indicators" mandatory by January 1st, 1949. The airlines may fit any approved type, whether radio altimeters or radar, and several lines have already installed them. Regulations governing the height at which high ground must be covered have also been revised, and the minimum height now required is 2,000ft. The investigations on altimeter error, results of which may have been published by the time this appears in print, may well explain other fatal accidents in which aircraft collided with high ground.

In addition to the President's Special Board, the Civil Aeronautics Board have been carrying out their own very thorough enquiries into the accidents, and some interim reports have been published. In the case of the La Guardia crash, their first findings were very guarded, and they wisely did not as yet attempt to give a specific reason for the failure of the machine to take-off. This was not the case in the report of yet another governmental enquiry, that of a Senate investigating Sub-committee who blamed the pilot for a number of wrong decisions. It may seem strange that there should be so many different enquiries going on at the same time, but that is the way things are done here. Sometimes this is to the good, but more often one is tempted to think that the public—for whose benefit such committees exist—is more confused than enlightened. Personally, I would think that the final C.A.B. report on this particular accident would be the most reliable.

In the case of the Eastern Airline DC-4 Maryland crash —which was obviously the result of structural failure— the papers reported that the C.A.B. were considering the theory that the elevator trim-tab cable may have broken

American Newsletter . . . . .

and the machine then became uncontrollable, diving more and more steeply until it hit the ground almost inverted. There was also a story of excessive nose-wheel vibration when taxying. Furthermore, an examination of the airscrews indicated that the engines were giving "plenty of power" at the time of impact. Admittedly these are only theories or snag-sheet histories that come out at the enquiry The answer may never be really known, but a final report will be published by the C.A.B. when the enquiry is completed, and until that time any suggestions as to the cause of the accident are sheer guesswork.

* * *

THE fact that there are three separate committees examining these accidents high-lights an American characteristic which probably puzzles British observers. It is often difficult for us to understand the apparent value that is set on reports from special consultants or special committees. Committees are appointed, boards convened, or consultants engaged at the drop of a hat, and let it be said with all fairness that some pretty sound suggestions come out of such appointments. But it is apt to be confusing to the onlooker. Associated with this is the value the American public place on the spoken word, that is, once the speaker has authority, actual or imagined.

Newspapers in their headlines on almost any subject seem to prefer to quote an individual's personal reaction to a situation rather than the facts of the situation itself. Which is again all right if the person concerned is both knowledgeable about his subject and balanced in his pronouncement. The public, too, must be capable of drawing correct deductions from what is said. Unfortunately, such requirements are often lacking. Such a system is also open to considerable abuse should someone become a public character (and therefore an expert) because of his personal popularity at the moment. Aviation, being an industry that has always attracted publicity-seeking "Me-Toos," has suffered considerably in this respect. Therefore it is as well to remember that the value of a statement here is in direct proportion to the knowledge, ability and integrity of the person who makes it. And it should be borne in mind that very often those most qualified to talk on a technical subject are the most retiring.

Another unfortunate result of the appointing of these numerous committees is that, once convened, they must come out with something. Even if they do not sell their souls, such experts often cook up some very old potage in order to justify their existence. This doesn't matter much so far as the aviation industry is concerned, but it may vitally affect the public reaction to aviation.

THE FOLKESTONE RACES (*Concluded from page 218*)

Lympne Airport. A smaller course with turning points at Lympne, Summerhouse Hill and Horton Priory, has been selected for the one-class scratch race for Tiger Moths, so that, given good weather, the aircraft will be in sight throughout this event

Prizes of £100, £50 and £25 will be given to the winners of the Folkestone Aero Trophy, and a prize of £100, presented by Dunlop, Ltd., will be awarded to the winner of the Lympne High-Speed Handicap. The Siddeley Challenge Trophy, presented by Lord Kenilworth, C.B.E., and £25 added by the Royal Aero Club, will be awarded to the flying club whose representative is highest in the placings of the Folkestone Aero Trophy. In addition sums of £10 and £5 respectively will go to the flying clubs' representatives who gain second and third highest placings.

The races will be flown under the competition rules of the Royal Aero Club and the regulations of the F.A.I. Handicapping is by Messrs. Rowarth and Truman. In W/C. Truman Mr. F. Rowarth will have a new partner to replace Mr. Dancy who, for many years, made up the famous pair of handicappers.

ENTRIES

FOLKESTONE AERO TROPHY

Entrant	Pilot	Aircraft	Entrant	Pilot	Aircraft
—	T. Rose	Hawk Speed Six	Goodyear Tyre & Rubber Co. Ltd.	J. Oliver	Aerovan IV
J. N. Somers	J. N. Somers	Hornet Moth	A. L. Cole	A. L. Cole	Tiger Moth
C. D. Godfray	L/Cdr. P. Godfrey	B. A. Swallow	Hunting Flying Club	G. Clarke	Proctor I
J. E. Coxon	W/C M. J. Earle	Mohawk M 12	C. R. Jackson	B. Collins	Magister
D. J. Jemmet	D. J. Jemmet	Auster V	Cinque Ports Flying Club	—	Tiger Moth
Wolverhampton Aero Club	Ron Paine	Hawk Trainer III	Tipsy Aircraft Co.	J. O. Matthews	Tipsy B
Ditto	Reg Pyatt	Ditto	R. W. Kenny	R. W. Kenny	Auster
604 Squadron R.A.F.	F/L R. Harding	Cygnet	Field Aircraft Services	P. B. Hill	Proctor I
A. J. Walter	Peter Landauer	Piper J. 4A	R. Temple Harris	R. T. Hill	Proctor V
Aircraft & Allied Enterprise	G/C Mole	Bibi	De Havilland Aircraft Co.	R. B. Hartnoll	T.K.2
S/L Bennett Baggs	P. G. Lawrence	Blackburn B2	G. O. Lawton	F/L Findley	Messenger
Air Schools, Derby	R. L. Porteous	Chiltern	Air Kruise (Kent) Ltd.	P. Cowell	Gemini
Air Kruise (Kent) Ltd.	W/C Kennard	Consul	Y. Helfenberger	M. Dekert	Beechcraft Bonanza
De Havilland Aircraft Co.Ltd.	P. Fillingham	Chipmunk	Yves Pougnet	Yves Pougnet	Hawk Major

LYMPNE HIGH SPEED RACE

Hawker Aircraft Ltd.	W. Humble	Fury I	De Havilland Aircraft Co. Ltd.	W/C J. Cunningham	Vampire I
Col. Robert Blackburn	P. G. Lawrence	Firebrand TF V	Fairey Aviation Co.	G/C G. Slade	Firefly Trainer
Vickers Armstrong Ltd. Supermarine	S/L G. Morgan	Spitfire Trainer 8	Fairey Aviation Co.	Lt. Peter Twiss	Firefly IV

SIDDELEY TROPHY RACE

United Services Flying Club	J. N. Somers	Hornet Moth	Wolverhampton Aero Club	Reg Pyatt	Hawk Trainer
South Coast Flying Club	L/Cdr. P. Godfrey	B. A. Swallow	Luton Flying Club	A. L. Cole	Tiger Moth
Wolverhampton Aero Club	D. J. Jemmet	Auster V	Southend Flying Club	Bernard Collins	Magister
Ditto	Ron Paine	Hawk Trainer	Cinque Ports Flying Club	—	Tiger Moth

TIGER MOTH SCRATCH RACE

Col. R. Blackburn	P. G. Lawrence	Tiger Moth	Cinque Ports Flying Club	Hunt	Tiger Moth
Norman West	W/C Kennard	" "	Lympne Country Club	G. Clarke	" "

THE TUDOR ACCIDENT

FROM an appreciation by Sir Roy Dobson, C.B.C., J.P., managing director of A. V. Roe and Co., Ltd., we quote the following:

In Roy Chadwick the company lost its technical director who, for some 35 years, was chief designer and was responsible for many famous types. He had a natural flair which was quite uncanny, and which was backed up by a sound engineering knowledge. From the personal point of view I have lost an old and trusted friend who stuck with me through thick and thin.

Sydney Albert Thorn, our chief test pilot, was one of the first in the country, with long and varied experience—steady and enthusiastic. As a friend I feel his loss extremely deeply.

S/L. David James Baikie Wilson was recently decorated by His Majesty. He was a technician of extraordinary ability and a valuable member of the company whose loss is going to be felt very severely.

Joseph Webster, the radio operator, was a likeable, hard-working, competent enthusiast who loved his job.

Edward Talbot is a keen flight engineer, with aerodynamics in his blood, inherited from his father, who is superintendent of the flight sheds at Woodford. We are hopeful of his recovery.

Stuart D. Davies, our chief designer, has received slight injuries but is all right. We are truly thankful for his merciful escape.

CIVIL AVIATION NEWS

NIGHT MAIL. The first purely mail/freight service operated by British European Airways about to leave Northolt on August 11th. The Dakota freighters now leave on six nights a week for Brussels and Prague, returning the next day with mail and freight over the same route. Air connections carry the mail to other destinations in Europe.

Air Section on Baltic Exchange : Ambassador Progress and Future Development : B.O.A.C. Flying-boat Hours

BALTIC AIR EXCHANGE

ON Monday, August 18th, a number of air charter operators met and agreed that they would support the opening of an air charter section on the Baltic Exchange. Two days later a meeting was held in the Merchants' Hall, St. Mary Axe, at which Sir Norman Vernon, the Chairman of the Exchange, presided, and at which 250 were present, including air operators, traders and members of the Baltic Exchange. After some discussion, it was decided to start an air section and to allow air operators to become members.

Already some air charter companies have made use of the Baltic Exchange through broker members, and the new air section will be complementary to the existing organization for shipping. There will, however, be a greater number of broker members necessary for the additional work, but it is thought that no intensive reorganization will be necessary. The fact that the Exchange is open only from 10 a.m. until 4 p.m. will not be a disadvantage as already a considerable amount of business is carried on outside those hours. There will be no official opening of the air section but it will gradually expand with the election of new members and the increase in business.

ANSON V IN EUROPE

THE third Canadian-built Anson V to cross the Atlantic passed through this country recently on a delivery flight to Tarsa, S.A., the new Swiss Charter Company. The first was delivered to Loftleider H/F. in Iceland in June last year and the second flew recently to Norway for a demonstration tour. The Anson V with a payload of 2,750 lb has accommodation for nine passengers, a maximum speed of 194 m.p.h., a cruising speed of 150 m.p.h., and when fitted with two extra 42-gallon overload tanks, as it was for the Atlantic crossing, the range is 900 miles. The transatlantic journey was made through Greenland, Iceland and Prestwick. A description of the aircraft appeared in *Flight*, July 17th.

Tarsa S.A. with a subsidiary company, Air Bleu, is operating, from Geneva, and another Anson and a Beechcraft 18 are on order and a Taifun.

TUDOR AND PLYMOUTH ACCIDENTS

THE first prototype Tudor II, G-AGSU, crashed at Woodford, on Saturday, August 23rd, killing four of the occupants, namely, Mr. Roy Chadwick, Chief Technical Director of A. V. Roe, Mr. S. A. Thorn, Chief Test Pilot of the firm. S/L. D. Wilson, chief of Avro's flight test section, and Mr. J. Webster, the wireless operator. The aircraft had been used during the past eighteen months for development purposes and was equipped with research instruments and automatic observers but it was not furnished. It was, however, loaded with water ballast tanks. There is a second prototype of the Tudor II on which development work will continue, and a third has had Hercules engines installed and is now referred to as the Mark VII

Roy Chadwick

S. A. Thorn

The circumstances of the crash were that about 300 yards after take-off the starboard wing dipped and touched the ground; it then struck a hedge and the aileron was ripped off. The aircraft finally came to rest about 200 yards farther on.

On the same Saturday a B.O.A.C. Plymouth-class flying-boat, G-AHZB, crashed on alighting in the dark at Bahrein. The aircraft had left Hong Kong on the 20th August and was due at Poole on Sunday, 24th August. Seven passengers and three members of the crew are missing, but of the remainder, the majority are either unhurt or not seriously injured. This is the first time a passenger on a B.O.A.C. flying-boat service has been fatally injured since November, 1943.

(*An appreciation of the Avro team will be found on page 229*)

AMBASSADOR REVIEW

WITHOUT doubt the Ambassador is one of the most advanced and most interesting British civil aircraft that has yet been flown. Time is therefore now opportune to review progress and examine the possibilities of future development. Behind the design lies a capacity for steady development over a period of years, and it may be said that the Ambassador is capable of being adapted to any future progress with either reciprocating engines or airscrew turbines. Such adaptability has provided a wide range in speed and performance which will see the type through many years of airline operation.

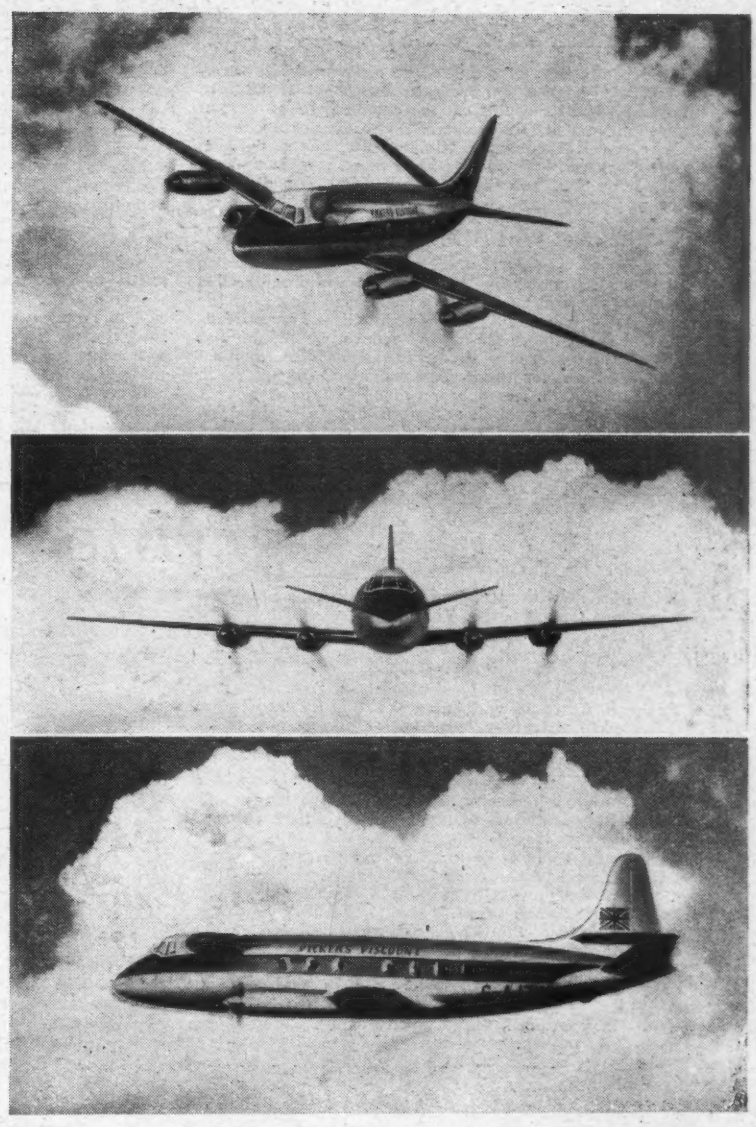
The first prototype was based on 1944 estimates and, Airspeeds point out, will be flown at an all-up weight of 45,000lb, but the second prototype, which is now under construction, and all production aircraft will be stressed to take normal maximum loadings up to 52,500lb. The first batch of production aircraft fitted with the 630 series Bristol Centaurus power plants will have an all-up weight of 47,000lb in order to comply with I.C.A.O. requirements for safety. That version, with accommodation for 40 passengers in a pressurized cabin, will have a still-air range of 1,000 miles at 255 m.p.h., flying at 12,500ft, while carrying a paylcad of 8,400lb.

The 630 series Centaurus, which now develops 2,600 b.h.p., may be expected, after further improvements, to develop 2,850 b.h.p., which will allow the Ambassador, while still complying with I.C.A.O. requirements, to fly at an all-up weight of 49,000lb. At the previously quoted speed, height and payload figures a still-air range of 1,450 miles will be possible. With the introduction of the Centaurus 660 series, the operational height will increase to 20,000ft and take-off power will be in excess of 3,100 b.h.p. The all-up weight will then be increased to 52,500lb, permitting, with the same number of passengers travelling with an extra luggage allowance, a speed of 290 m.p.h. at 20,000ft and an overall range of 2,000 miles. It would also permit an alternative 48-passenger version with a still-air range of 1,600 miles.

Two further possible versions of the Ambassador are being considered, one with four Napier Naiads and the other with two Bristol Proteuses. However, no final decision has yet been reached about the type or types of airscrew turbine units which will be fitted to the finally developed version of the Ambassador. It is understood that the general performance in each of the two cases so far considered will be similar, but with better speed figures for the twin-turbined version.

Since the prototype first flew on July 10th the aircraft has been undergoing resonance tests as a result of which, coupled with findings on the first flight, modifications are being made to the tab and balance system of the rudders. It is also being fitted with reversible airscrews and several other items not installed before the initial flight. The tests showed that the Ambassador was stable in all axes and was easy to handle. It was particularly good on the approach and landing and, generally speaking, the results were promising. The manufacturers are confident that in its performance and technical features, and particularly in the prospect of continued development, the aircraft shows promise of a great future.

Large-scale production cannot go ahead, however, until support is evident from the home operators. There has been considerable interest shown by operators overseas; but without substantial orders from operators such as the three British Corporations or the R.A.F., it will be difficult for Airspeeds to develop the first series of production aircraft and eliminate those "bugs" which are only discovered in regular operation on various routes. The company is planning proving flights all over the world, but this is not sufficient. Support from British operators would have the effect of reducing production costs and allowing the Ambassador to be placed on the market at a price which would be competitive with American aircraft produced in large quantities.



INTRODUCING THE VISCOUNT: As announced in "Flight" on August 7th the Vickers V.C.2, originally known as the "Viceroy," is now to be referred to as the "Viscount". The pressure-cabined civil transport will be powered by four airscrew turbines, but information on the precise type to be installed is not available. Prototypes are under construction and are designed for carrying 32 passengers at 30,000 ft and 325 m.p.h. over 1,700 miles.

TWO NEW G.E.C. PRODUCTS

THE General Electric Company, who have made galley equipment a speciality, have just introduced an Air Circulation Oven designed in conjunction with J. Lyons and Co. Constructed of light alloy the oven operates at an electrical loading of 2 kW and is so designed that the heated air is distributed evenly throughout the interior. The high efficiency results in low operating time and 24 frozen-food meals can be cooked in 40 minutes as compared with the 1¾ hours required by previous ovens. It is of particular interest to note that the Air Circulation Oven functioned with complete satisfaction during the recent tropical trials of the Tudor IV.

Another G.E.C. innovation which is of considerable import-

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ance is the production of a miniature airborne VHF transmitter/receiver designed for private owner class aircraft. Weighing only 8½ lb the unit can be supplied for 12 volt or 24 volt systems and fits the standard S.B.A.C. racking. Single channel two-way R/T communications on any one of the civil aviation frequencies is provided, with a range comparing very favourably with the "full size" installations normally used in service and commercial aircraft.

FLYING-BOAT UTILIZATION

ELEVEN of the eighteen Hythe class flying-boats in service with B.O.A.C. flew more than 2,000 hours in the twelve months up to the end of March. The hours flown by the remainder were very close to 2,000, with the exception of *Hadfield,* which was out of service for two months for repairs and flew only 1,583 hours. Every aircraft in the fleet was grounded for nearly two months for interior conversion and the figures, in most cases, represent in fact only ten months' flying.

The greatest number of hours were flown by *Harwich* G-AGKZ with 2,248 hours; *Hunter* G-HGLA was a close second with 2,242 hours, and *Hythe* G-AGJM flew 2,233 hours.

These utilization figures are particularly impressive in view of the routes over which the "Hythes" have been operating.

INTERNATIONAL AERADIO PLANS

PRINCIPAL European airline members of the International Air Transport Association attended a meeting on the 15th August convened by International Aeradio, Ltd. It will be remembered that the British company was formed at the beginning of this year, with Mr. Whitney-Straight as chairman, for the purpose of installing and operating radio aids to navigation throughout the world wherever they may be required and where they would not otherwise be available. When appointed managing director of B.O.A.C. Mr. Straight relinquished his appointment in International Aeradio and Sir Victor Tait, already a director of the company, is the new chairman.

Future plans were discussed, and the formation of a Committee of European operators was considered for the purpose of solving the problems of radio in the European theatre. The meeting also considered that it was necessary to form a neutral and representative international body to function within the orbit of I.A.T.A., at the same time following closely the principles of I.C.A.O. in order to promote safe, regular and economic airline operation. The meeting considered that International Aeradio could provide the basis of such an organization. Many other problems which were discussed were referred to I.A.T.A. Discussion was adjourned, however, until after the meeting of the Technical Committee of I.A.T.A. in Nice on September 1st.

BREVITIES

AIR INDIA are now operating a daily return service between Bombay and Calcutta with Viking aircraft. This service takes the place of the former Bombay-Calcutta run through Nagpur.

* * *

Quantas Empire Airways have been authorized to operate a service between Australia and Japan starting on September 15th. Lancastrian aircraft will fly the route twice a week in each direction

* * *

Captain O. P. Jones has relinquished his post with Aer Linte Teoranta and is returning to B.O.A.C. as a senior captain on Constellation aircraft flying the North Atlantic route.

* * *

Mr. N. E. Rowe, Chief of Research and Long Term Development in B.E.A., will be assisted in his "gust" research work by Dr. G. S. Hislop previously at R.A.E., Farnborough, and A. and A.E.E., Boscombe Down. The trials will be flown by 1st Officer T. Thomas of the B.E.A. Continental division.

* * *

On September 1st K.L.M. transfer the operation of their London services to London Airport. Croydon has been the operational headquarters in the U.K. for K.L.M. passengers and freight services since the company's first Amsterdam-London schedule was started in 1920. K.L.M. will occupy a group of buildings at London Airport which have been constructed for their use.

A proving flight is being made by the China National Aviation Corporation from Shanghai along a projected route to Singapore and Batavia. Flying facilities and airports on the route are being inspected.

* * *

The Lockheed Aircraft Corporation has advised prospective purchasers of increases in the basic prices of all Constellation aircraft. The increases are due to become effective on September 1st and range to a maximum of 12,500 dollars per aircraft.

* * *

Pan American Airways have sent 20 senior pilots, engineers and maintenance staff to the Boeing Training School at Seattle for a three-week general familiarization course on the operation and servicing of the Stratocruiser. P.A.W.A. have ordered 20 of these aircraft, and delivery is expected to start late this year.

* * *

The New Zealand delegates to the South Pacific Air Transport Council, which began at Canberra on August 11th, were led by the High Commissioner for New Zealand in Australia, Mr. Barclay. Other members were the Assistant Secretary of External Affairs, Mr. Foss Shanahan; the Air Secretary, Mr. T. A. Barrow, and the Director of Civil Aviation, Mr. E. A. Gibson. The South Pacific Air Transport Council is made up of representatives of the Governments of the United Kingdom, Australia. New Zealand and the Fiji Isles.

RADIO MEETING: Sir Victor Tait, Chairman of International Aeradio Ltd., and his staff met representatives of the principal European operators last week to discuss radio plans for air routes over Europe. Left to right: R. A. Gratz, T.W.A., Sir Victor Tait, Mr. Mulhern, A.O.A., W.Cdr. Cunningham, B.O.A.C., V. Wolfson, B.E.A., R. Scott-Farnie, I. A. Ltd., C. S. Cadell, Managing director I. A. Ltd., Sir Victor Tait, J. V. Wood, B.E.A., K. Kemble, I. A. Ltd., Patrick de Laszlo, I. A. Ltd.

THE PERTH DISPLAY

EVIDENCE of the Scottish public's interest in aviation was provided at Perth on Saturday, August 16th, when nearly 10,000 people attended the Perth Air Display held at Scone Municipal Airport. The display, which had the support of the Perth Town Council, was organized by Airwork, Ltd., and the Strathtay Aero Club. It provided a wide variety of interests for those who took advantage of the good weather and the opportunity afforded them to see Scone Airport operating under post-war conditions. Apart from the flying demonstrations, there was a large selection of both civil and military aircraft open for inspection in the aircraft park, and a static exhibition of armaments and ancillary aircraft equipment arranged by the R.A.F.

After the opening of the display at 2 p.m. by the Lord Provost of Perth, Mr. J. Ure Primrose, heads were raised to watch F/L. Lowden perform aerobatics in a Harvard. At the same time pilots of No. 11 Reserve Flying School, flying Tigers and Magisters, took off for some tied formation flying, and in spite of the "bumpy" conditions caused by the hot sun, they managed to keep station and complete their part of the programme without breaking the tapes.

The one-design race for Auster aircraft flown over a 7½-mile course was won by Mr. D. Kay (Loch Leven Flying Club) in 4 min 11 sec at an average speed of 104.7 m.p.h., and later a similar race for Tigers was won by Mr. A. Campbell-Melville.

Contrasted with the short hops accomplished by G/C. A. H. Wheeler, in the "Shuttleworth" 1909 Bleriot monoplane, was the smooth performance of a Miles Messenger, which demonstrated its manœuvrability and slow-flying characteristics low over the heads of the spectators. Formation flying by a flight of three Spitfire XIVs of No. 612 (County of Perth) Squadron was next on the programme, after which Madame Bellu-Decourt, who is now a familiar figure at shows of this kind, earned her usual round of applause when she landed safely after a free parachute descent from about 1,500 ft.

The younger members of the audience were particularly thrilled when a Lancaster of No. 120 Coastal Command Squadron visited the show and made bombing runs over a dummy submarine which had been built at one side of the airfield. During this demonstration the public heard the crews' R/T conversation relayed over the loudspeaker system.

Other events at Perth included slow aerobatics in a Tiger by Mr. A. F. A. Underhill, a pilot of Airwork, Ltd.; a flypast and mild "beat up" by a Lincoln of No. 101 Bomber Squadron; glider-flying by S/L. Rollo and Lt. Cdr. Sproule; and a demonstration of the de Havilland Dove.

Lt. (Engineer) Peter Lubbock's performance in a Seafire must receive special mention. His high-speed manœuvres were outstanding, and a hesitation roll executed with delightful finesse indicated masterful control of his machine.

Top left: A view of the public inspecting the varied array of civil and military aircraft on show during the Perth Display. Below: A Miles Messenger seen from an unusual angle while it demonstrated its slow-flying characteristics. Inset: Lt. (Engineer) Peter Lubbock who gave a polished performance of aerobatics in a Seafire XV.I.

Left: This discussion group included, left to right, Capt. R. H. McIntosh, D.F.C., A.F.C., Rear-Admiral The Mackintosh of Mackintosh, Lord Provost of Perth, Mr. J. Ure Primrose, Lord Lt. of Perth, Lord Kinnaird, Mr. J. M. Pearson, Sir Archibald Hope and Mr. I. D. M. Liddell, W.S.

FROM THE CLUBS

TWENTY-FOUR members, including some experienced ex-Service pilots, besides *ab initio* pupils, joined the Cambridge and University Aero Club during July. A total of 194 hours 55 minutes' flying was accomplished during the month, and five first solos were successfully completed. Club members visited the Deauville and Elstree rallies.

* * *

The Wolverhampton Flying Club flew 200 hours during the month of July. Five of the club's aircraft are being entered for the Lympne International Air Races, which are being held on August 30th and 31st, and a large contingent of W.F.C. members is expected to visit Lympne for the event. Mr. Ronald Paine, of the Wolverhampton Club, won the Southend-on-Sea Air Trophy on August 9th, flying G-AHNU, one of the club's Miles Hawk trainers.

The tea fight organized by the Redhill Flying Club which took place on Sunday, August 17th, was reminiscent of pre-war club gatherings. No fewer than twenty-two aircraft landed at the airfield during the afternoon, ten of these without having their registration numbers spotted by the eight defending aircraft. The Women's Junior Air Corps' Fairchild Argus, this time flown by Miss Audrey Morgan, an ex-A.T.A. pilot, took part in the defence, and later was kept busy giving flights to members of the Corps. Redhill club members have worked very hard since last May redecorating and furnishing their clubhouse after it had been relinquished by the R.A.F., and it has now been made into a comfortable headquarters. Among the clubs represented at the tea fight were Elstree, Derby, Southsea, Southend, Shoreham and Sywell. About 140 people spent a pleasant afternoon at Redhill.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters

ELEMENTARY TRAINERS

Simplest Type Desirable

I READ with interest the letter of your correspondent "One-Time A.2," in the issue of August 14th, and most fully agree with his remarks re sending off first solos in large and unwieldy aircraft (presumably he refers to the Prentice). I have recently flown the Chipmunk, to which he also refers, and can imagine no aircraft more suited to *ab initio* work in the early stages.

It is possible, or even probable, that a pupil's introduction to flying in a relatively complicated aircraft may tend to reduce his accident-proneness in later life (I believe this theory has been amply tried out in the Service by having *ab initio* courses on Harvard aircraft), but I doubt whether this is more justifiable than an increase in his confidence due to starting off on the easiest aircraft possible.

DONALD A. S. McKAY.

TOWARDS HAPPIER LANDINGS

Auto Technique Before 1951?

MAY I thank, "Vertigo" and G/C. McDonald for their compliments on my article, which you were good enough to publish. My only regret is that the nature of the article was factual, so that I could not relate anecdotes concerning, say, a "bog-in" in front of the sewage plant on a station well known to G/C. McDonald (if only W/C. Oakley-Beuttler had been there!); or of the cross-wind at a certain manufacturer's airfield.

The estimate of 1951 for the general use of automatic approach, at least in Europe, we hope to be pessimistic. As you reported in your columns, S.A.B.E.N.A. have now taken delivery of the first of three DC.6 aircraft fitted with A-12 Gyropilots and Automatic Approach and they expect to have an SCS.51 ground installation at Melsbrook this year; other ground installations exist at Geneva, Amsterdam, Stockholm, Orly and Copenhagen. S.A.B.E.N.A. have Convair 240s on order fitted with A-12 and Auto Approach and K.L.M. and Swissair will also be helping to keep the A-12 flying all over Europe.

In conclusion, may I add a *requiscat* for Liberator KL.632. She and the A-12 have parted company after a highly successful and happy partnership and it is feared that, in spite of the care lavished on her by B.O.A.C. Development Flight, she is to be broken up. R.I.P. a very nice flying machine and many thanks to Dev. Flight for tending the old lady so well during her last few hundred hours.

R. T. TOWNSON.

FLYING-BOAT VERSUS LANDPLANE

The Question of Economic Size

TO the average intelligence it should be obvious that landplanes, as they are to-day, have reached (I prefer to say outreached) their useful and economical size, beautiful as they are.

There is no reason why any limits should be laid down as to the actual size of an aircraft, but I feel the landplanes of to-day have reached their limit as an economical proposition with the Bristol Brabazon.

The size of landing grounds and runways for the safe landing and take-offs of such huge aircraft; the depth of concrete and foundations it would be imperative to lay to support the weight, not only on runways but also around perimeter tracks, concrete aprons and hard standings will be a most costly business, not to mention installation of adequate hangarage for overhauls.

Then comes another thought—what about diversions in bad weather? When an airfield is out, negative or won't accept, where is the aircraft going in?

How many other airfields are there that could accept it in the world, let alone "little ole England"?

The operator may say that airports are nothing to do with him, the State must provide. But, just the same, someone has to pay and it is you and he and I. He will have to pay in high landing fees, etc., as well.

Looking at it from another angle—what the result of an undercarriage failure from a financial point of view would be is just too unpleasant to contemplete (all underwriters please note and prepare to extract the rigid digit).

A chap was looking over my shoulder at a beautiful picture of one of these high land flying contraptions, and all he said was, "oh, boy, there's going to be a hell of a big crash one day" (I rebuked him for using the word "crash").

Also over-running the runways, a swing into the rough or a burst tyre or tyres would not be the simple matter that it is to-day

The weight of the massive undercarriage, wheels, tyres, etc., with all the relevant machinery, must cut down the pay-load considerably, not to mention the additional cost in maintenance. Wear of tyres alone will constitute a major running item. These things, therefore, make the big landplane of the present day a wash-out economically.

What is the answer? Obviously the flying-boat. No undercarriage to worry about. The bigger the boat the better the seaworthiness. All the world to land in, and diversional spots galore.

As for take-off, what with jets, squirts, rocket and what have you, there should be no difficulty in getting it airborne in a short time and with a short run. Added to which, of course, we have air refuelling.

One could go on *ad infinitum*, detailing the advantages of the really large flying-boat against the landplane, but it is unnecessary to do so as any sensible person can appreciate them for himself.

T. NEVILLE STACK, Capt.

[*It is always gratifying to receive support for a cause which one has been championing, and Capt. Stack's letter sums up the arguments which this journal has been advancing for years, preaching the flying-boat case in and out of season. Fortunately there are indications that not all the seeds have fallen on stony ground.*—ED.]

PRODUCTION—FROM THE INSIDE

IN a Government publication called *The Aircraft Builders* the well-known author Nigel Balchin has lately told, for the benefit of the man in the street, the story of Britain's stupendous effort in aircraft production during the war years.

Of its kind, this little book is a good one, but for the reader who is intimately connected with aviation, its "popular" nature must inevitably engender a desire for something rather more technically factual. Such a review does, indeed, exist—in the pages of the *Journal of the Institution of Mechanical Engineers*—and now it achieves wider dissemination by publication in our associated journal *Aircraft Production*. The author is Eric Mensforth, C.B.E., M.A., M.I.Mech.E., A.F.R.Ae.S., M.I.P.E., deputy managing director of Thomas Firth and John Brown, Ltd. and vice-chairman of Westland Aircraft, Ltd, who was, during a considerable period of the war, Chief Production Advisor to the Chief Executive at M.A.P.

In this notable record, which bears the severely practical title "Airframe Production," Mr. Mensforth traces in detail the steps by which, from 1935 onwards, the industry stepped up its potential until eventually it absorbed over 40 per cent of the whole munition effort of the country. Throughout his contribution, the author shows the progressive and ever-changing integration of design with production, and his account is supplemented by a number of extremely informative graphs and tables.

The first part of the article appears in the September issue of *Aircraft Production*, now on sale, and the second and final instalment will appear in the following month's issue.

FORTHCOMING EVENTS

Aug. 28th to Sept. 13th.—Engineering and Marine exhibition. Olympia, London.
Aug. 30th and 31st.—Cinque Ports Flying Club. Folkestone Air Races meeting. Lympne airport.
Sept. 3rd to 6th.—Royal Aeronautical Society: Aeronautical Congress.
Sept. 6th.—Naval Aviation: Air display and static exhibition. Lossiemouth air station, Moray, Scotland.
Sept. 6th.—Air display at R.N.A.S. Yeovilton.
Sept. 9th.—Royal Aeronautical Society: Dinner at the Guildhall, London.
Sept. 9th to 12th.—S.B.A.C. Exhibition and Display.
Sept. 13th to 15th.—Cannes Aero Club "Ailes d'Azur" Film Festival air rally. Cannes-Mandelieu airfield.
Sept. 14th.—Royal Aeronautical Society: Garden party, Radlett airfield.
Sept. 17th to 19th.—Federation Aeronautique Internationale: Annual General Conference, Geneva.

SERVICE AVIATION

"Flight" photograph.

MODIFICATION : A new air-to-air shot of the de Havilland Vampire Mk. III showing the alterations to the tail unit.

Air Aide-de-Camp

G/C. (ACTING A. CDRE.) A. S. ELLERTON has been appointed Air Aide-de-Camp to the King in place of A. Cdre. Staton who relinquishes his appointment on promotion to substantive rank.

Coastal Appointment

A. V-M. F. L. HOPPS, A.F.C., has been appointed A.O.C. No. 19 Group, Coastal Command. Since July, 1945, A.V-M. Hopps has been Air Officer in charge of administration at headquarters B.A.F.O. Formerly he was A.O.C. No. 16 Group, Coastal Command, whose battle area stretched from the Skaggerak to Cherbourg. A Londoner by birth, he served in the Royal Flying Corps in the 1914-18 war.

No. 65 Group

ABOUT 200 more R.A.F.V.R. pilots are needed to bring the establishment of No. 65 Group (South and East England area) up to strength. Recruiting is at No. 84 Reserve Centre, Chessington, Surrey.

Return from India

NO. 5 Fighter Squadron, R.A.F., which has been stationed in India since 1920, is on its way home in the liner *Georgic*.

D.A.F. Occasion

MEMBERS of the Desert Air Force and of other arms who fought alongside them will meet at a reunion in the Royal Albert Hall on September 20th. Lord Tedder will preside, and the six A.Os.C. who, in succession, commanded the Desert Air Force in its advance from Cairo to Klagenfurt, will be present. They are: A.V-M. R. Collishaw, Air Marshal Sir Arthur Coningham, A.Cdre. Sir Harry Broadhurst, Air Marshal Sir William Dickson, A.V-M. R. M. Foster, and A.Cdre. C. L. Falconer. There will be music by the R.A.F. Central Band and a cabaret by radio stars. Lord Tedder and other guests will speak.

Royal Air Force and Naval Air Arm News and Announcements

New Flag Regulations

ACCORDING to a new Air Ministry order, all R.A.F. aircraft will in future fly the Royal Standard when carrying the King. The appropriate standards will also be flown when Service aircraft carry certain other members of the Royal Family, and the personal flag of the Secretary of State for Air when he is a passenger. The R.A.F. ensign will be flown for the heads of foreign states, various dignatories of the United Kingdom, the Dominions, the Colonies, including the Prime Ministers, and (as far as the U.K. is concerned) Cabinet Ministers, together with the Commanders-in-Chief of the three Services.

The flags are mounted on a flag staff in a socket above the pilot's cockpit and flown when the aircraft is at rest during the time that the passenger concerned is in the immediate vicinity. The flag is, of course, stowed before take-off. Formerly, the only flag flown by Service aircraft was the R.A.F. ensign—by flying boats of Coastal Command.

Badge of No. 201 Squadron R.A.F. "Hic et ubique" (Here and everywhere).

Badge of No. 269 Squadron R.A.F. "Omnia videmus" (We see all things.)

Medals for Ferry Pilots

CANADIAN and United States citizens who flew as civilians on the British transatlantic ferry routes, and on other routes outside the American continent, are now eligible for British Campaign Stars and War Medals.

No. 617 Squadron in California

ON Friday, August 15th, No. 617 Squadron, now visiting the U.S. in 16 Avro Lincolns, was honoured by an invitation to G/C. Thomson to "Sign the wall" at the airmen's Chapel of Saint Francis at Mission Inn, Riverside, close to March Field. The ceremony consisted of G/C. Thomson signing copper signs and hammering them into the wall of the chapel, which was dedicated as an international shrine for aviators in 1932 and is a favourite chapel for air weddings in the Western States. Wings already up include those of Generals Arnold, Spaatz and Eaker, and others include Rickenbacker, Pangborn, Ellsworth, Amelia Earhart and Kingsford-Smith. The only other

Service Aviation . . . . .

British flyers so honoured are A. Cdre. P. F. M. Fellowes, Lady Drummond-Hay and Peggy Salaman. After the ceremony G/C. Thomson gave the host of the mission the R.A.F. wings from his tunic

Memorials to R.A.F. V.C.

MEMORIAL plaques to one of Scotland's Royal Air Force V.C.s, the late F/S. George Thompson, of Milnathort, Kinross, have been unveiled in two country schools in Kinross-shire. The ceremonies in the schools at Portmoak and Kinross where F/S. Thompson was a pupil, were performed by Air Vice-Marshal Kingston-McCloughry, A.O.C. No. 18 Group.

Born at Perth in 1920, F/S. Thompson enlisted in the Royal Air Force in 1941 and served in Iraq and Teheran as a wireless officer (ground) before returning to the U.K. in 1943 to train for aircrew duties. He had been on operations for only two months when, in January, 1945, he was posthumously awarded the Victoria Cross.

F/S. Thompson was in a Lancaster of No. 9 Squadron, Bomber Command, in an attack on the Dortmund-Ems canal early in 1945 when the aircraft was set on fire by a shellburst. He rescued the unconscious gunner from the blazing upper-turret, braving exploding ammunition and using his bare hands to beat out burning clothing. Although severely burned about face, hands and legs F/S. Thompson then went to the rescue of the rear gunner, also unconscious in his blazing turret. Again he beat out the flames with his bare hands and extricated the helpless man. One of the two gunners survived but F/S. Thompson himself died in hospital from his injuries three weeks later.

DOWN TO EARTH—(1) Cpl. Moody of Transport Command puts a peculiar finish to her long jump attempt at the Inter-Command athletic meeting.

R.A.F. Drop Food in Bengal

SUPPLIES of rice are now being dropped by the R.A.F. to relieve the flood-affected population of the Chittagong area according to arrangements made by the Air Command, Far East, in response to a request by the Governor of Bengal.

Dakotas of No. 10 Squadron, which recently left Mauripur (Karachi) to carry out this task, will drop an initial supply of 80,000 lb of rice. The whole operation is expected to be completed in a total of 14 sorties.

Similar operations were carried out in this area during the floods which occurred in August last year, when over 1,250,000 lb of supplies were dropped.

Flying Training in Japan

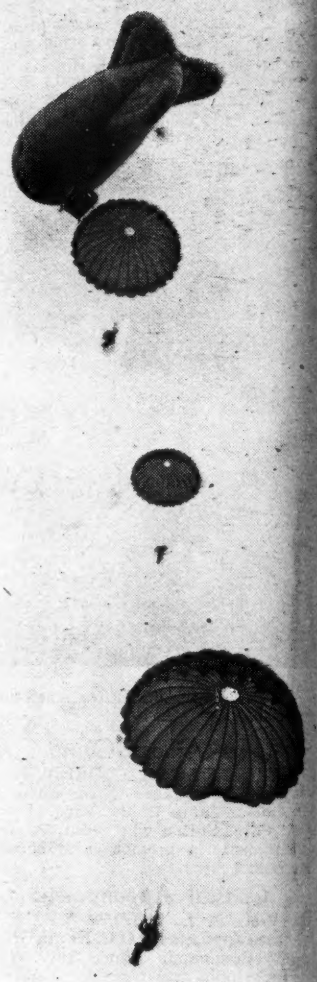
MIHO, on the Northern coast of Honshu, formerly a Japanese Army Air Force fighter station and navigational school, is now a main training centre for British Commonwealth Air Forces in Japan. The airfield has concrete runways, large hangars and repair yards. The first R.A.F. squadron to take the course at the bombing range, built there by British personnel, was No. 17. During three weeks they dropped 584 10½lb practice bombs and 26 25lb high-explosive bombs. The average error was 24 yards, and the most successful pilot missed by only 7 yards. During firing practice, 8,500 rounds of 0.5 armour-piercing incendiary bullets and 1,300 20 mm cannon shells were used. One pilot scored 75 per cent hits on the target. Another unit to use the Miho range was No. 4 R.I.A.F. Squadron, flying Spitfires, which carried out extensive air-to-ground firing practice before leaving Japan recently.

Rocket-firing is performed on a floating target anchored off Atada Shima, a sparsely populated island a few miles from the main B.C.A.I.R. base and headquarters at Iwakuni. Among units which have recently used this range are No. 14 R.N.Z.A.F. Squadron (Corsairs), the three Mustang squadrons of No. 81 Wing R.A.A.F., and American bomber squadrons. An 81 Wing practice, in April, was watched by Army officers attending an "air-liaison" course with B.C.A.I.R.

Another bombing range, at Mahoohama, was built by 81 Wing and is in regular use.

Iwakuni, severely bombed by the Allied Air Forces during the war, was a Japanese naval air station, and also the base for a squadron of "Kamikaze" suicide pilots. In addition to large numbers of wrecked Japanese aircraft on the airfield, British forces found, lying on its side in the harbour, a light cruiser which had been built in Britain in the late 1890s, sold to Russia, and awarded to Japan as reparations after the Russo-Japanese war of 1905.

Co-operation with Naval forces forms part of the B.C.A.I.R. training when this can be arranged. When units of a Naval force visited Kure, during April, three exercises were carried out by the New Zealand Corsairs, and massed "attacks" on the vessels made by the Australian Mustangs.



DOWN TO EARTH—(2) Territorial paratroops of the 16th Airborne Division making training jumps from a kite balloon. An instructor on the ground passes his orders by loudspeaker.

"Wings" Finale

"WINGS," the spectacular R.A.F. pageant produced by Ralph Reader which has toured the provinces since April 28, is to have its finale at the Royal Albert Hall, London, on September 14, the opening day of Battle of Britain Week. The occasion also marks the annual festival of reunion of the Royal Air Force Association, and the proprietors of the *Daily Telegraph* have generously offered to defray expenses. The proceeds will go to the R.A.F. Benevolent Fund and to the R.A.F. Association. Artists engaged for this final performance are expected to include Gladys Ripley, Denis Noble, the Alexander Choir of 250 voices and the B.B.C. Theatre Orchestra.